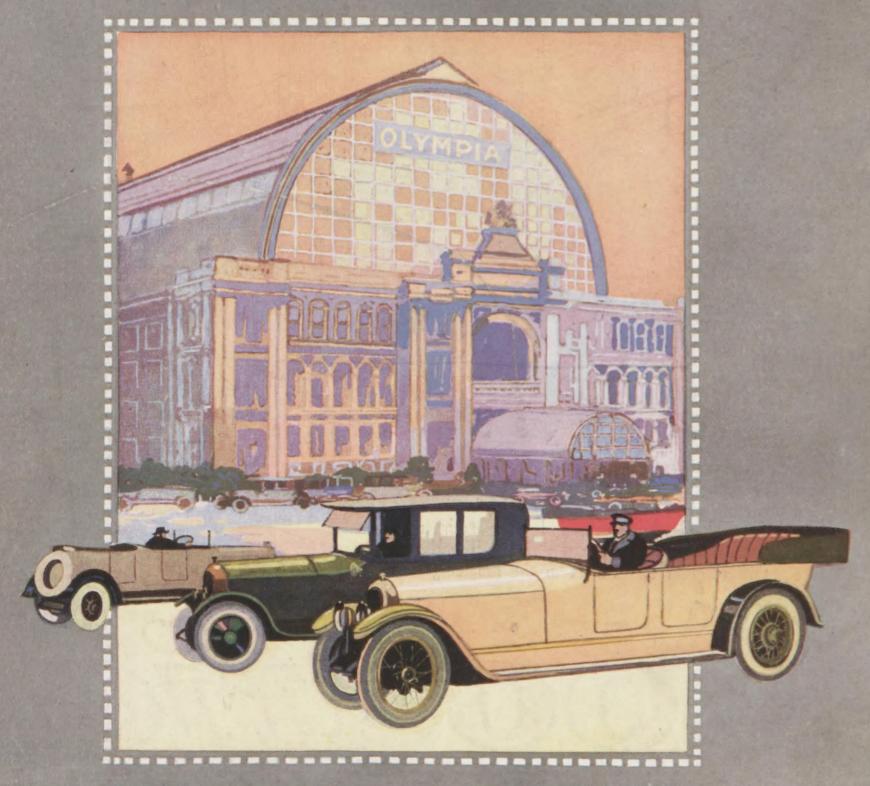
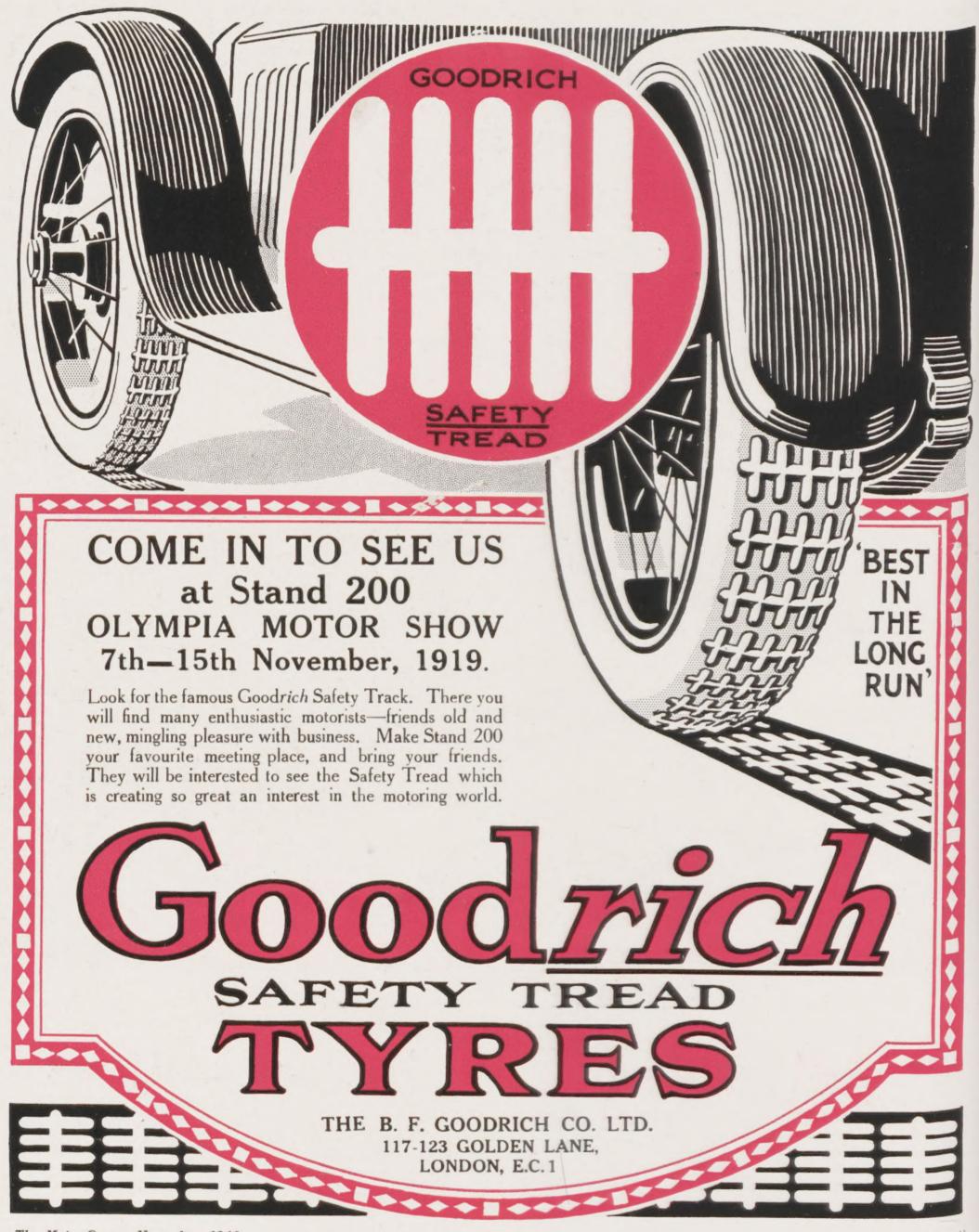
MOTOR OWNER 1919 NOVEMBER 1919

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Parsons Chains indispensable

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23. STORE STREET,

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Don't allow this to happen It looks silly - feels horrible (4) might cause somebody's death -

The Motor-Owner, November, 1919

Page it



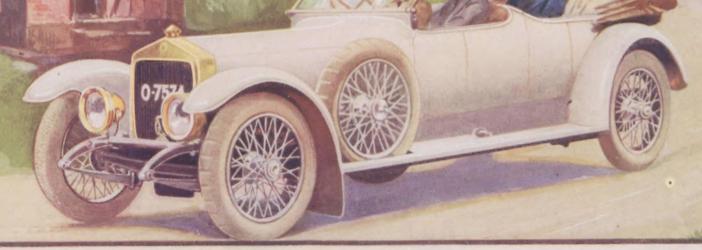


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THE Car that has aroused so much interest will be on view on

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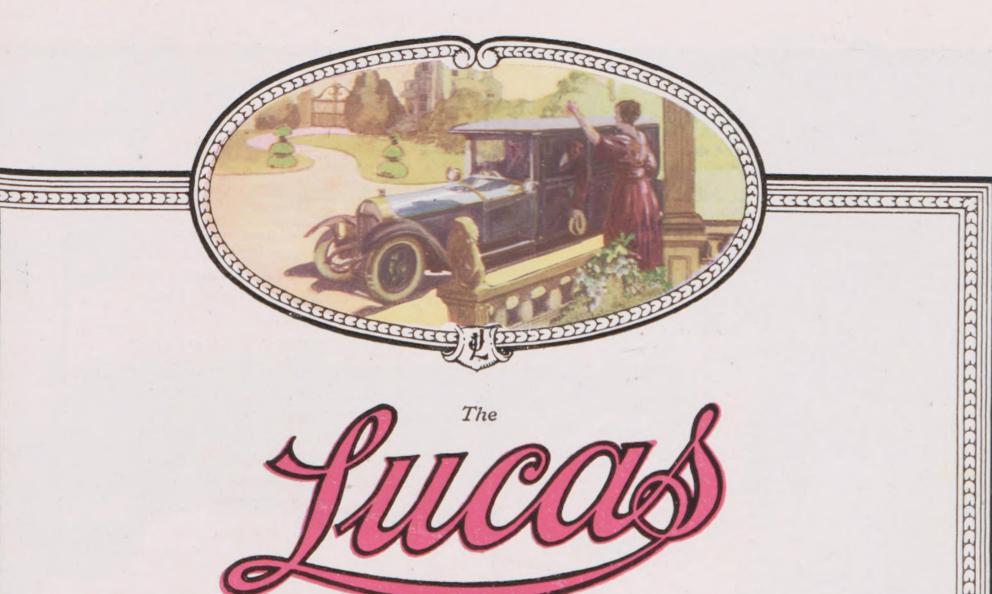
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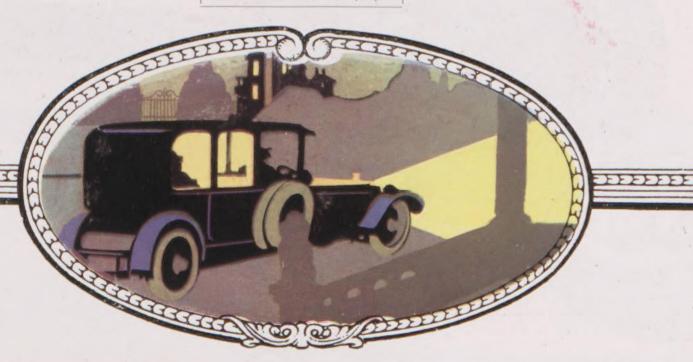
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Designed and manufactured by

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Electrical and Illuminating Engineers, Birmingham

See that your choice of a new car rests on one that is Lucas-equipped







Page ix





Olympia Motor Exhibition STAND No. 97

1920 MODELS

11 h.p. 4 cyl. 66 × 105 16 h.p. 4 cyl. 82 × 130

32 h.p. 6 cyl. 95×140 (valveless)







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WHERE supplies are ample and demand is universal, standardisation makes for economy. The Government do well to direct attention to American systems of standardisation. We can, with advantage, copy many of them.

But room must always be left for originality, for supremacy, for the unique in design, for the artistic in expression.

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As Eastern colour cannot become the standard for the West,

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During the temporary period of control, Haig & Haig Whisky has had to be sold at the same price (in the Home Market) as the poorest and youngest home-made Spirit. This will be changed when control is removed.

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very scarce
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No new accounts
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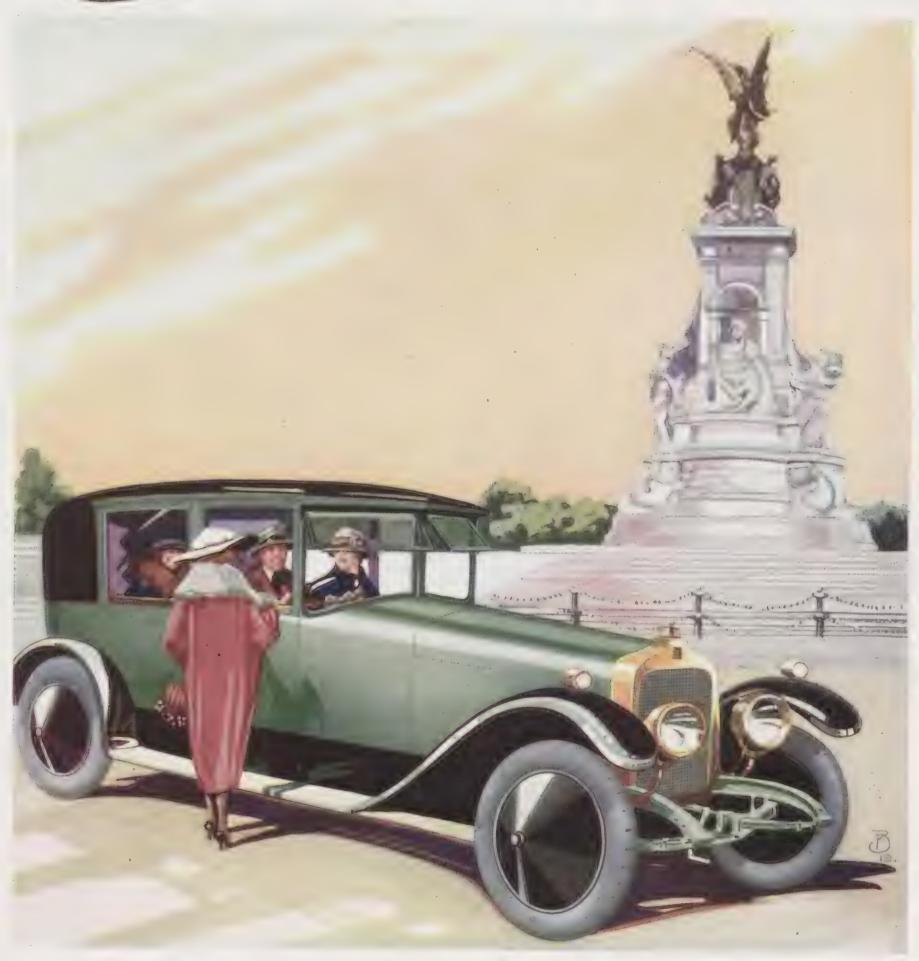
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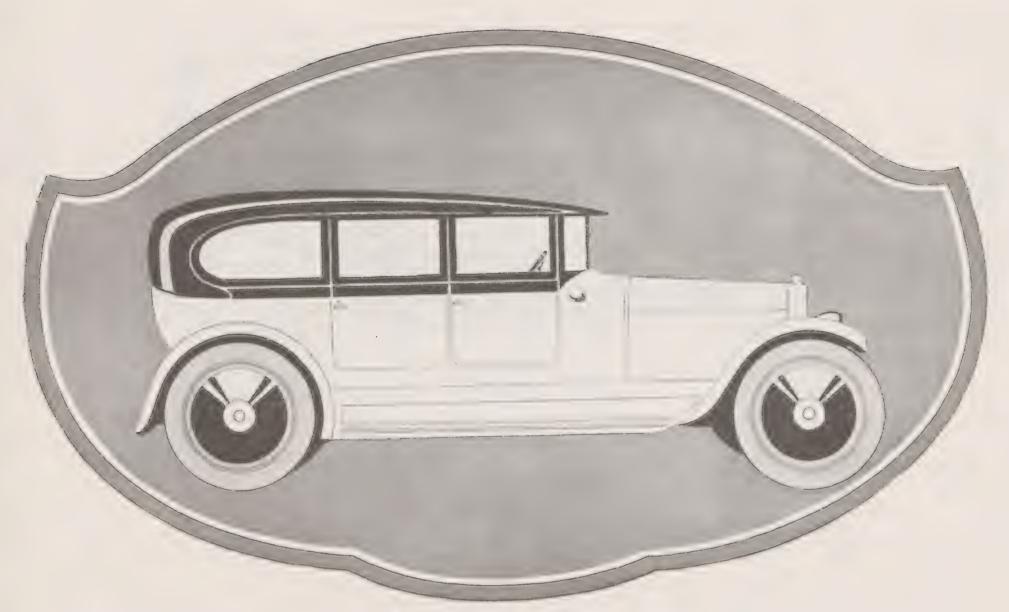
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HEAD OFFICE AND WORKS: STAINES



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"A" Thames" production

Thames bodies are rapidly achieving a reputation for grace and elegance of line, for choice material, skilled workmanship and a close regard to detail and delicacy of finish that places them in the very front rank

Thames bodies are not claimed to be the "best" in the world, but it is claimed for them that they are second to none, and comparison between them and the best productions of the best firms in the coachbuilding trade is confidently invited

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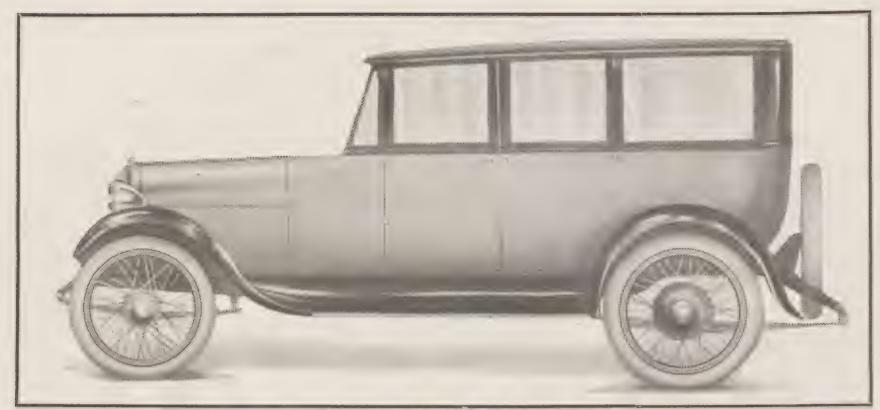
Thames bodies are manufactured at Wandsworth and at Sunbury-on-Thames. The works are always open to inspection, where bodies may be seen in all the various stages of construction

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Six-cylinder 1920 Saloon Model, price £995

PAIGE The Most Beautiful Car in America

This marks the introduction in England of the famous Paige Car. Immediate orders are now invited.

Four-door 5-passenger Saloon Model (shown above), inside drive, dynamo lighting, self-starter, spare wheel, perfect anti-theft device, heavy plate-glass windows and screens, famous Paige quality and Paige-finish throughout.

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Deliveries will be made in strict order of receipt of instructions.

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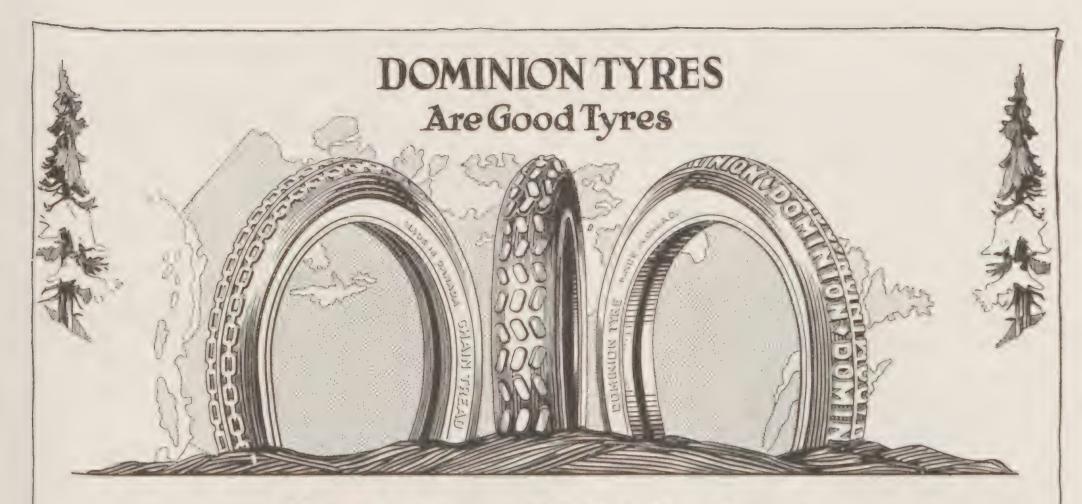
The new Paige Models

will be on view at the

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at the Adamite Company's

Stand, No. 22



Our Page Of History

How Canadian Records were Substantiated in Great Britain, and what came of it.

On the cars that are driven venturously on non-stop endurance runs, over the rutted, boulder-strewn trails that wind tortuously from among the foothills of the Rockies across the great Canadian prairies, will be found a large percentage of Nobby, Chain and Dominion Tread Tyres. In the cities and on the better highways of the East, the names Nobby, Chain and Dominion are synonymous with great performances in mileage, service and tyre value. They are the logical development of extreme conditions—tyres for all types of cars, all service requirements and individual needs, dedicated to low running costs—factors that have enabled us to attain our present strong position.

In 1915 the first importations reached Great Britain at a time when tyres were in abundance. Motorists and dealers had then the choice of nearly every known make of tyres, on terms that do not pertain to-day. Unknown, unheralded, without any advantages of publicity, Nobby, Chain and Dominion Tread Tyres, made in Canada, were offered solely on achievement records—outstanding quality.

They made good because they gave the promised service and much more—always, unfailingly.

Then came the necessary restrictions on motor travel. Tyre stocks accumulated everywhere and competition intensified, yet the sales of Nobby, Chain and Dominion Tyres increased steadily, solely on their reputation for supreme value; a reputation liberally accorded to them by enthusiastic users.

Through 1917–18, handicapped by severe import restrictions, Nobby, Chain and Dominion Tread Tyres faced still greater tests. Owners had to use them mercilessly, pile on the extra miles that seemed incredible. But sound construction triumphed. Marvels were related about them in the garages and centres where men talk tyres.

Such absolute prestige had these tyres obtained among motorists and dealers that each shipment was already sold ere it arrived. Waiting lists assumed enormous proportions. During these four trying years 71,374 sales were registered, figures that could have been doubled easily had supplies been available. And every single sale was made on sheer merit, the ability of Nobby, Chain and Dominion Tread Tyres to create new standards of value and service.

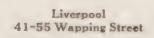
To-day there is a promise of better supplies; regular shipments henceforward.

Ask at your garage—tyre dealers—of your motoring friends—anyone who knows tyre values; the reputation of Nobby, Chain and Dominion Tread Tyres is secure at their hands. Better still order a set for your car. You can select the type that just exactly meets your requirements—tyres that will come up to your every expectation of service—and give you something more besides.

SEE STAND 184 AT OLYMPIA

ANNOUNCING A NEW TYRE-TO COME

An announcement of extraordinary interest to motorists will shortly be made—about a new Tyre and rim equipment which under the severest tests has given truly remarkable mileage and general service results. Watch for Dominion Tyre announcements in this paper.



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JUST A PEEP

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will convince you that it is a distinguished car. There is beauty in its design and finish.

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A car light on tyres, fast and perfect to drive in traffic. You will be delighted with the springing; it is the smoothest, most silent and cheapest running high-grade car to-day—and to-morrow.

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SPORTING MODEL \$550

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Page xliii



The New Motor Car



The Greatest Improvement in Riding Comfort since the introduction of pneumatic tyres

The exclusive Three-Point Cantilever Springs of the new Overland 4 Motor Car mark the greatest riding improvement since the introduction of pneumatic tyres.

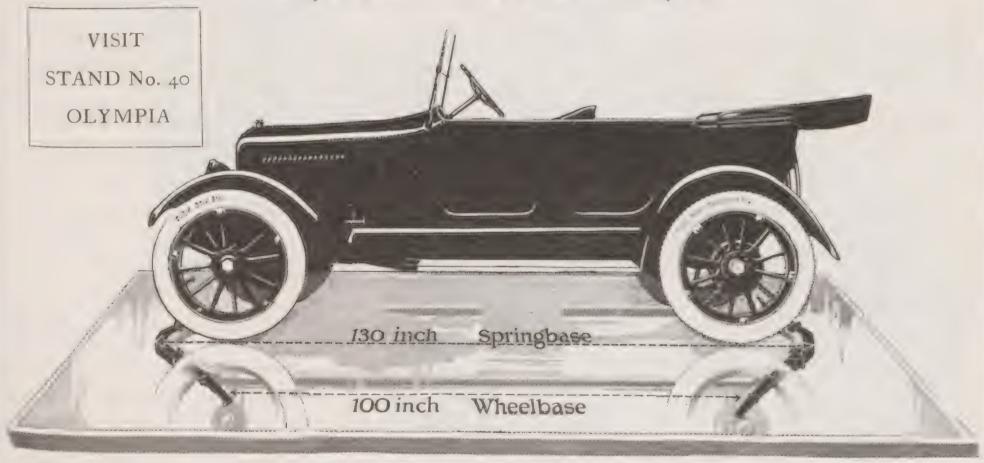
These springs, diagonally attached at the extreme ends of a 130-inch springbase, give Overland 4 with 100-inch wheelbase the steadiness and smoothness of riding which long wheelbase and heavy weight give the large car.

They smoothe out road roughness. They take up the jolts and rebounds.

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18 bed and dressing rooms, 3 bath, 5 reception rooms, electric light, heating, telephone.

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Nº77

PRICE 1350 Including Dynamo Lighting & Electric Horn ~

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 Complete car weighs less than 10 cwt., while power developed is over 30 h.p. This saves fuel and wear on the tyres.
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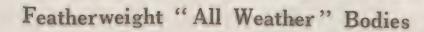
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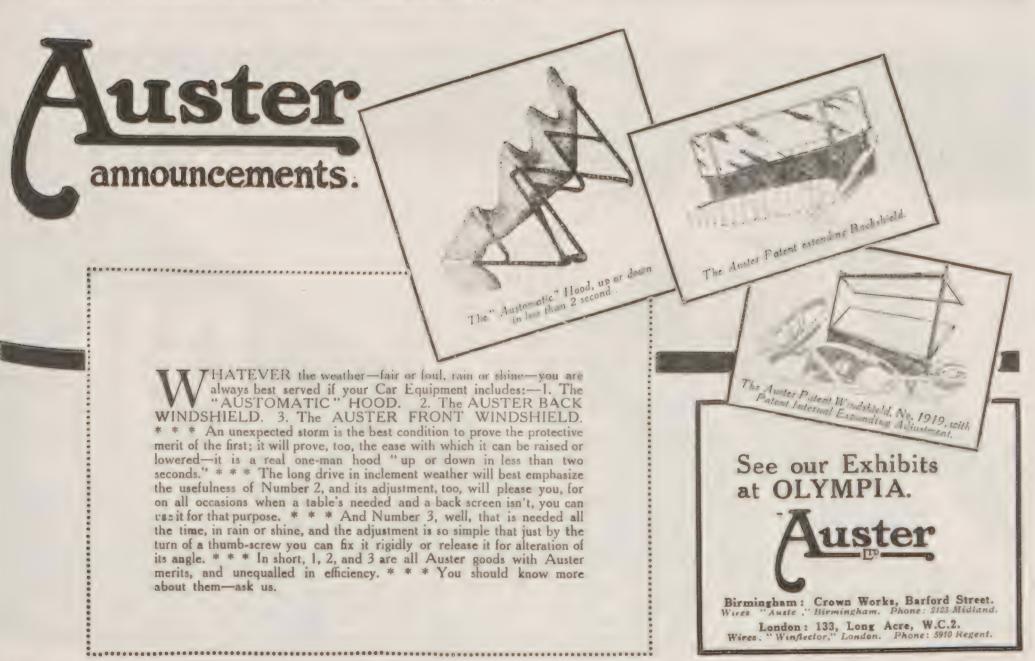
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They give perfect protection and lubrication



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Standard patent side curtains are carried in a compartment behind the driver's seat. An adjustable wind screen and double dickey seat are fitted, and the Standard patent scuttle dash, which combines an instrument board with a large tray for parcels, etc., is included in the design.

All bright parts of body and equipment

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12-volt 2-unit Lighting and Starting Set, including head, side and tail Lamps, and flush-fitting circular Switchboard, Horn.
Flush-fitting Speedometer.

Spare Wheel and Tyre. Dickey Seat.



1920 MODELS

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Air-cooled 5 6 h.p. or 8 h.p.
J.A.P. Engine, two speeds,
cantilever springing back and
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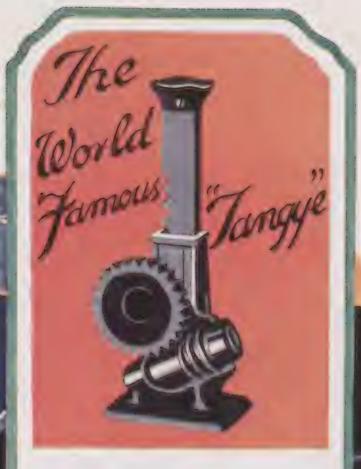
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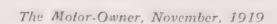
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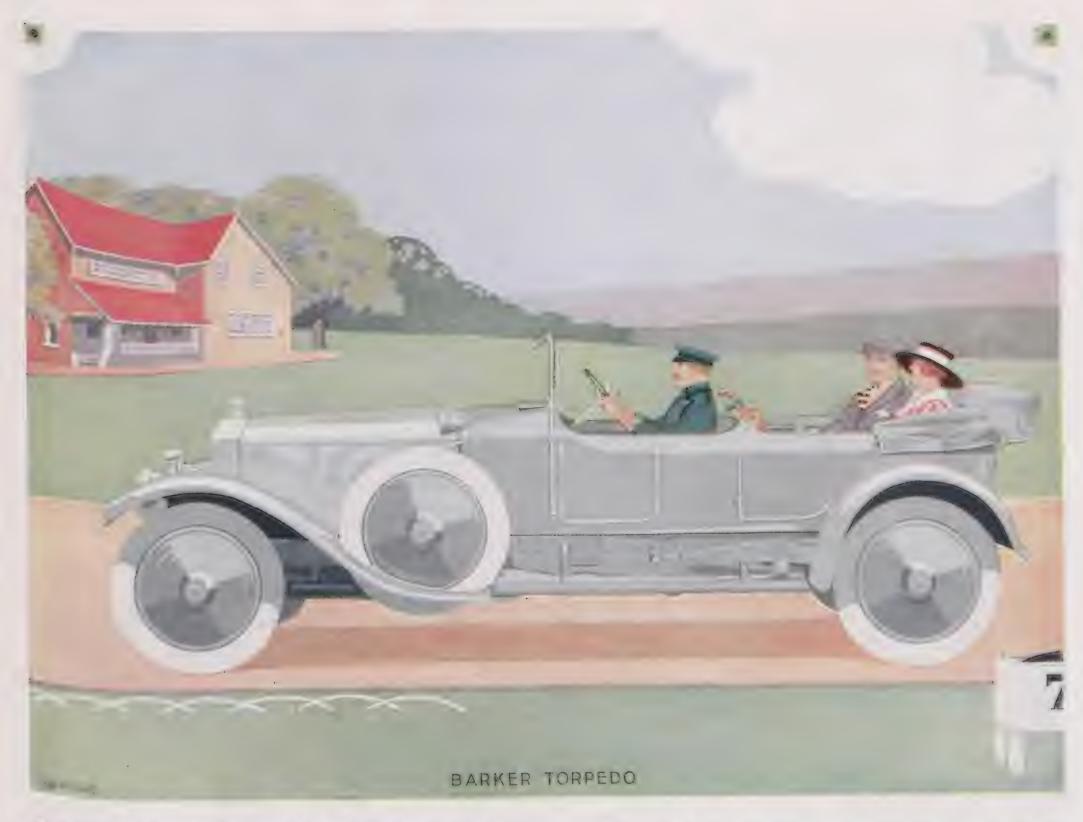
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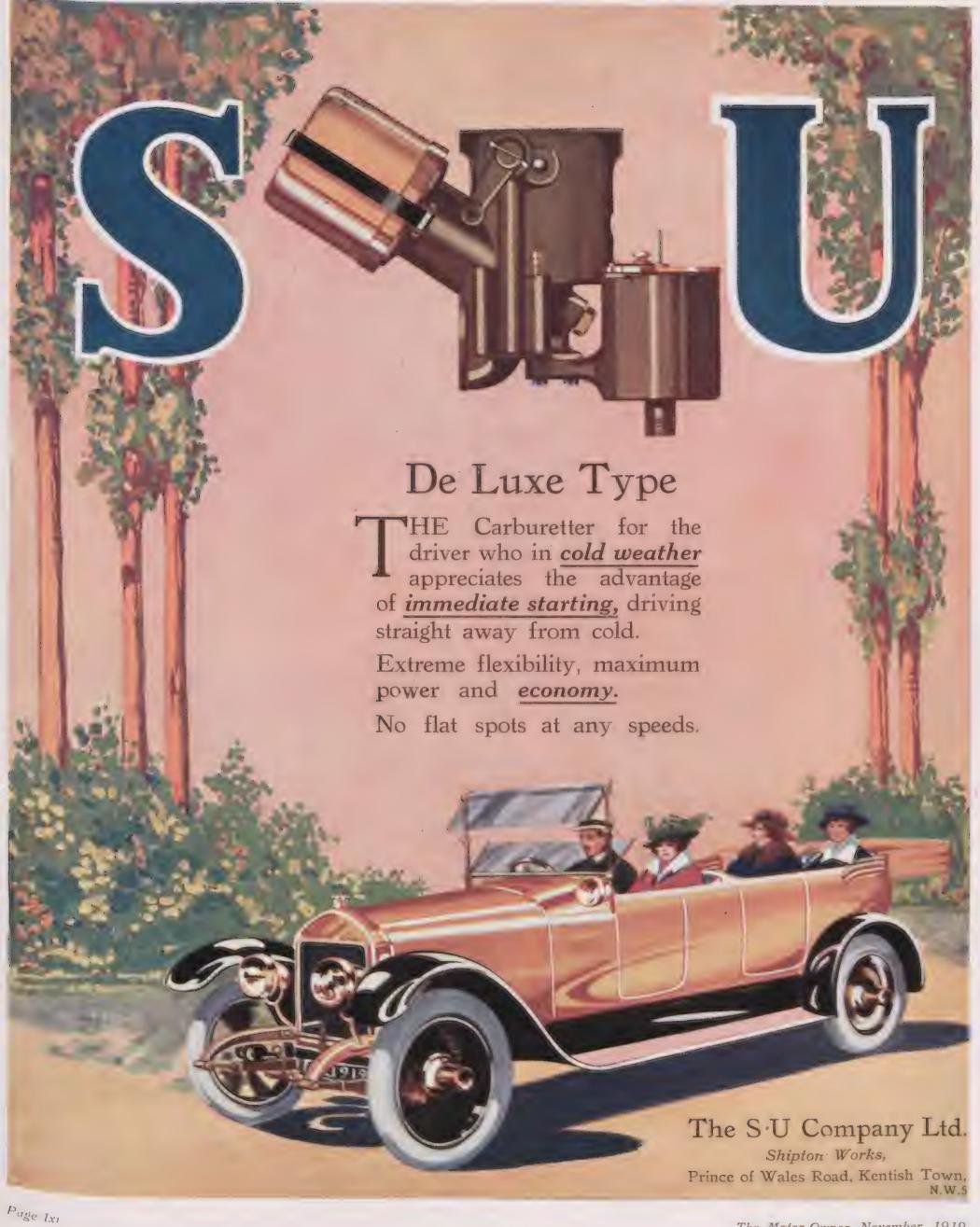
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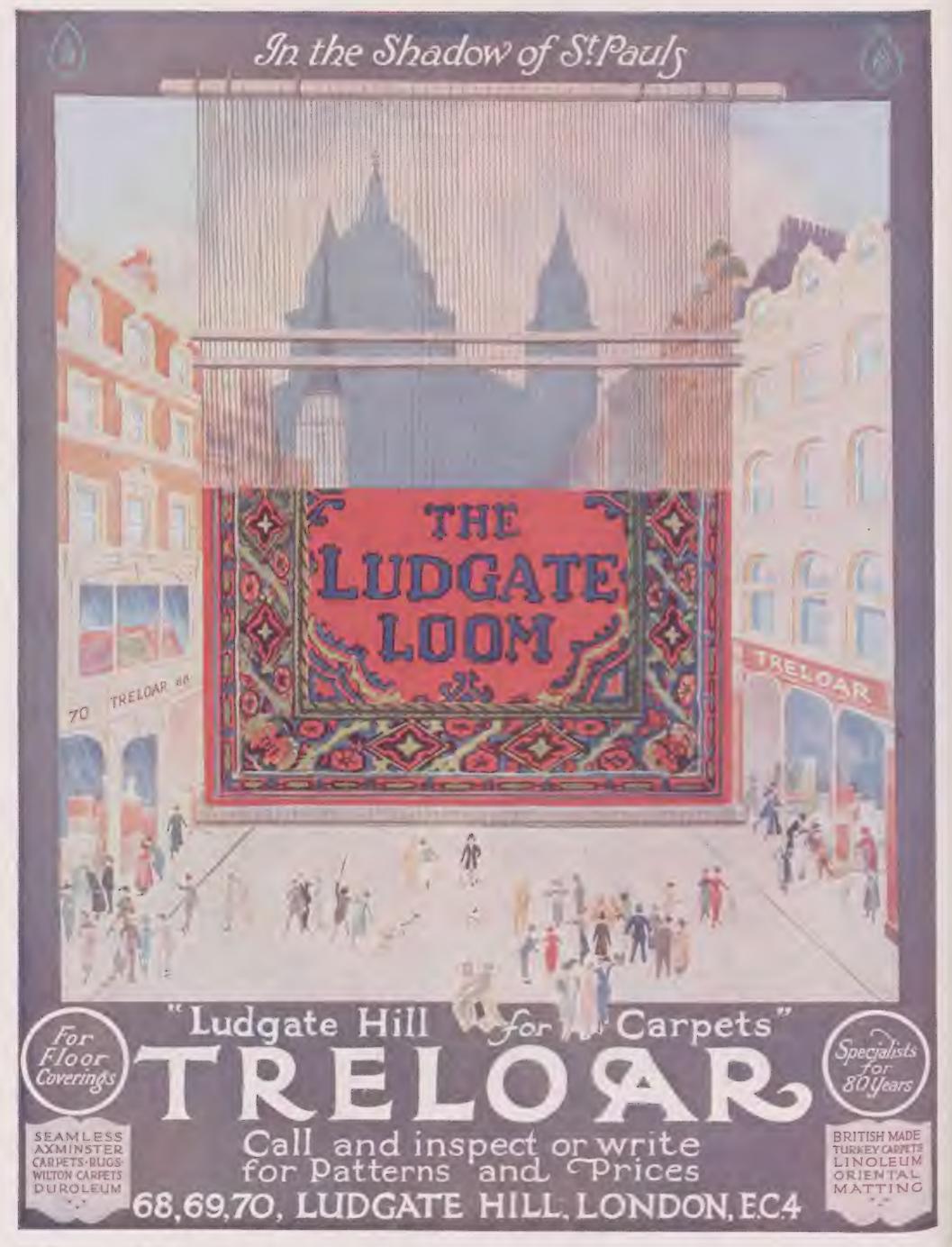
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Dunlop.











"SWANK"

Supplement to Motor Owner. November, 1919.



NOVEMBER, 1919.

THE REAL PROPERTY.

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(With this issue is also presented as a Supplement a special coloured illustration, entitled "SWANK," by E. P. KINSELLA.)

CALLED TO BALLET AN ARCHARACTURE AND ARC



Photo by.

A LAKELAND BY-ROAD.

THE STIFF CLIMB UP TILBERTHWAITE HILL.

[G. D. Abraham.



Vol. I.

NOVEMBER, 1919.

No. 6

EDITORIAL JOTTINGS.

The concrete manifestation which The Olympia the Olympia Show provides may well cause the British motorist to heave a deep sigh of relief, and to realise that the war is really over. He expected no small degree of amelioration as soon as the armistice was signed, but how completely his hopes have been dispelled in that respect is now too well known to need little more than the mere mention. For nearly twelve months he has been awaiting delivery of cars that have only materialised in an extremely limited number of instances. After six years of war and war's aftermath, nevertheless, the Olympia Show has been revived, and the fact is one that evokes a widespread and heartfelt satisfaction.

This great revival is accompanied Improvements. by a previously unsurpassed display of improvements in car construction and design. Matters had become somewhat stereotyped before the war, whereas the great majority of cars at the 1919 show will be found to have undergone revision in numerous respects. There may be few individual chassis of a revolutionary kind, but all-round improvements of detail are omnipresent, whether we turn to the various factors of engine design, the transmission, the suspension, the equipment, or the needs of the owner-driver. In an article which we publish elsewhere in this issue, under the title of "What to see at Olympia," will be found a A RESTRICT OF THE RESTRICT OF THE PERSON NAMED IN systematic analysis of the tendencies of the year, as well as a summary of the most interesting exhibits to which the visitor may wish to have his attention directed in advance.

From the illustrated report of The Paris the Salon de l'Automobile, which appears on pages 27-34, it will be realised that French motorists, equally with ourselves, are able to rejoice in a great post-war revival. The Salon of 1919 has proved worthy of its long line of brilliant predecessors, and the continental models are characterised as ever by a keen attention to artistic finish. In one respect, moreover, the Paris Show has given us food for thought in a wholly unexpected way, for it has resuscitated the old problem of frontwheel brakes, or rather of braking on all four wheels. This is being discussed on the other side more than any other topic, by reason of the extraordinary effectiveness of the system as displayed on two well-known cars. A London motorist, moreover, who lately took a long run on one of these while in the French capital, has expressed himself very enthusiastically on the subject of front-wheel braking. Being somewhat addicted to picturesque hyperbole he delivered himself as follows: "The cemeteries are full of people who have died as the result of pulling up short on the Blank car. It flies along at 'umpteen' miles an hour; a child gets in the way; you give up everything as lost—and lo! the car is stopped in a yard or two and the child is unhurt. But the passengers die of shock!"

The position of the would-be buyer or seller of a French or other Continental car is for the time being peculiar and unprecedented. An import duty of $33\frac{1}{3}$ per cent. on a cheap American vehicle may not be formidable, but on a high-class and expensive chassis from France, Belgium or Italy is undoubtedly a factor of serious importance. It seems highly probable, therefore, that the trade in Continental cars, so long as the duty is maintained, will be materially restricted except in so far as the rate of exchange may relieve the situation. The new Hispano-Suiza, for example, has impressed the Paris cognoscenti as the car of the year, where the Salon is concerned, but is priced at 50,000 francs for the chassis alone. With the duty and the cost of a first-class body superadded the total figure becomes colossal; but with the franc at 7d., the price would not be much higher than that of a duty-free car at a

normal rate of exchange. The franc, neverthe-

less, is gradually regaining its pre-war value. The "Hold Up" MOTOR-OWNER we commented on the extraordinary delay that had taken place in the delivery of new cars, and asked if anything more specific in the way of explanation could be produced than whatever might be construed from generalities as to "labour troubles." Some interesting sidelights have since come under our notice, and go to show that there is small likelihood of a return to pre-war conditions as regards rapidity or economy of output. The hours of labour, of course, have been considerably reduced, and its cost increased by 100 per cent.; but work has been, in some quarters, so lackadaisically performed that one leading manufacturer, from whom great things were expected in the way of quantity production, has been hung up all along the line by inferior castings, which have had to be "scrapped" at times to the extent of 85 per cent.

One of the most significant incidents, however, of which we have ever heard concerns another important British firm. Everything was proceeding smoothly in the way of production save in the case of one department, which was very much behindhand with its output. The firm wished to put in two night shifts, by which it would have been enabled to increase its weekly production from twenty to sixty cars. Objection, however, was raised by a trade union. The firm thereupon pointed out that if overtime in this one

section were not allowed, an immediate discharge of 1,000 men would be inevitable. The union was obdurate, however; the men were discharged; and the weekly output of this particular car remains at twenty when it might have been increased to sixty with advantage to employers, employed, and the waiting public alike. So long as labour maintains this attitude it is obviously impossible for substantial progress to be made.

Prominent among various considera-Left-Hand tions which will affect the carowner in 1920 will be the question of left-hand, or central, control. Are we to become a nation of ambidextrous drivers or are we not? The system of placing the gearchange and hand-brake levers in the centre of the footboard is, of course, of American origin, and has now been adopted in surprising measure on British and Continental cars. The genesis of the change, however, was due to the fact that American designers chose some years ago to revert to the original practice of placing the steering column on the left side of the chassis, thus giving the driver a wider outlook behind a stationary vehicle in America and almost every country in the world. Our rule of the road, on the other hand, makes it preferable that the driver should sit on the right. Thus, while the American manufacturer had perforce to place his change-speed lever in the centre, and incidentally maintained thereby the use of the right hand, the British manufacturer must advocate the control system on mechanical grounds alone, and induce his clients to use their left hand with more facility than of yore. So, also, must the agents for American cars which have been converted for the British market.

Apparently the vendors have no Time will misgivings on the subject, but it is somewhat significant that French manufacturers who have adopted the central change have regarded the problem as serious, for they have mostly transferred their steering columns to the left and thus provided a righthand control. By the end of next year, however, there will be a sufficient accumulation of driving experience to determine the issue; either the central control will have proved unwelcome on British cars, and will be abandoned, or it will have been found to embody no particular inconvenience to the majority. In the latter event the central change-lever will speedily become universal by reason of its mechanical advantages and cheapness of manufacture.





Outstanding Features of the Show—Many Departures from Convention—New Multi-Cylinder Engines—Quantity Production—Aircraft Influence—Innumerable Improvements of Detail.

T is hardly to be doubted that this year the Olympia Motor Show attains to a higher importance and interest than in any previous season, regarded both as a social function and as an engineering exhibition, in both of which aspects it has, in the past, gone on from strength to strength. Whether this remarkable progress—for Olympia Show is unquestionably one of the great events of the year —will be continued in the future remains to be seen, but it is probably to be answered in the negative in view of the growing and justified unpopularity of the "season model," the production of which represents one of the most tutile and uneconomical policies of manufacture that could possibly be imagined. In every make chassis will continue to supersede chassis as further and further developments of design materialise, but the old-fashioned practice of designing a car simply in order to bear a new date or to supersede a former one that is conceivably just as good has definitely gone by the board.

Olympia will, therefore, one suspects, gradually cease to be the stage upon which new models make their bow to an interested public—even this season quite a large number of post-war, but pre-Olympia, cars have appeared, and a few are already on the road—and this fact will undoubtedly have its influence upon the exhibition as a social function. Thus the long series probably reaches its zenith in the Present show, which, from the technical point of view, is rendered all the more noteworthy since it marks the end of the protracted war-period of automobile stagnation, during which, however, a multitude of things has happened which will leave an indelible mark upon car design. This has already demonstrated its immediate susceptibility to the manifold advances that have taken place in engineering science.

Whilst, in the vast majority of cases, the British manufacturer had to turn aside from car production in order to make himself far more vitally useful in turning out munitions of war, it is quite obvious that his brains have not been idle, and that he has learnt many valuable lessons from the activities which military necessity has imposed upon him.

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Hence the genuine 1920 model—we are not here referring to the machine which has been more or less resurrected to bridge a gap or to satisfy the intense demand for "something at once" which sprang up directly after the armistice—is as far, if not farther, in advance of the 1914 model as if there had been a constant series of intermediates between these two historic dates. For the enterprising designer has, for the first time in his career, been able to free himself entirely from the shackles of convention and tradition, and apply himself to his drawing-board with a new zest, born, not of the mere desire to make something different from what he had achieved before, but of the determination to make the best possible practical use of the new territories of knowledge which have been explored during the war.

Had he been called upon to turn out '16, '17 and '18 models it is quite certain that, as in former years, each would have borne some family resemblance to the one preceding it, so that ultimately the 1920 would have been a distant, but by no means unrecognisable relative to the 1914. The war, however, amongst other minor blessings it has bestowed, enabled the clean cut to be made, and the car of to-day is the outcome not only of new principles of design, embodying new materials and new knowledge, but also of new and greatly improved methods of manufacture.

Both of these aspects of the matter are so important that they deserve to be entered into a little more deeply. Taking methods of manufacture first, one finds that a very strong section of the British industry has determined very definitely to go in for Quantity-Production. Whether the primary intention is to build the best car in the world, irrespective of price, or to produce that car of which the greatest number is demanded, the case remains the same. Quantity-Production is the only direction in which permanent success can be sought; and this term, it may be remarked, does not necessarily imply a six-figure annual output, any more than it implies that there must be any unavoidable sacrifice of quality. What it does, above all, mean is the entire abandonment of the "experimentalising"



1.—The 20 h.p. Belsize. 2.—The 12 h.p. Rover. 3.—The Austin "Twenty." 4.—The 35 h p. Lancia.

policy, which is never quite sure that it is right and makes changes, it would seem, for the mere sake of change.

It is quite a fallacy to suppose that the potential owner of the cheaper class of car is the only one who is chiefly interested in the new policy of standing by a design until another, with sweeping and conspicuous improvements, can supersede it. The possessor of the most luxurious vehicle

imaginable is rarely altogether above considerations of depreciation and good "service," to both of which the system of Quantity-Production, with the accurate standardisation it demands, contributes to an important degree. Again, the man of moderate means may very properly be more interested in the fact that scientific means of manufacture and sound works organisation will enable cars of a given quality to be made cheaper; but surely the man of wealth is not less intrigued by the fact that the same agencies will allow cars of the higher prices to be made even better and more luxurious, at the price, than ever before.

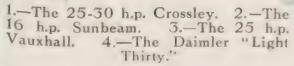
Then, again, a commanding tendency is manifest in all but a very few instances—namely, that the car, for the first time on this side of the Atlantic, at all events, whether it be cheap or expensive, is a thing





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on the other hand, aircraft were the war itself. Whereas the car designer was restricted to materials which were already in existence and therefore available, the aircraft engine designer had no hesitation in demanding new materials. He loudly called upon the steel chemist and alloy metallurgist to provide something better than they had ever



complete with all the various accessories, which have now very properly come to be regarded as very nearly as important a factor of motoring as the engine itself. The immediate result of this new way of tackling the problem is a great enhancement in appearance, in general convenience and in accessibility. The last named is conceivably a quality that can

be overdone, as strictly speaking accessibility is only called for in case of failure, but it cannot be denied that much of the so-called accessibility of the past evaporated entirely as soon as the chassis became equipped with bodywork and requisite fittings. By virtue of the new perspective in which it has been viewed, the need of "getting-at" the smaller details as the complete car has been adequately studied and an all-round improvement can be recorded.

But to return to the question of better manufacturing methods, it is clear that we have to thank the war for teaching us to do with ease many things which were once dismissed, as if not impossible, at least impracticable. It has been, in fact, found that closer limits in mechanical operations are little, if any, more difficult to work to the looser ones of six years ago. To put it figuratively, war necessity compelled the operative to make use of a micro-



devised before, and lo, and behold! the thing was forthcoming, urged forward by the spur of necessity. Of this state of affairs the car designer to-day has been quick to take full advantage. There is, indeed, not a single car in the Show which does not sensibly reflect aircraft influence, and of some models it may even be said that they are aircraft productions designed to run upon the road.

It is fairly safe to say that in 1913 chassis designers, whilst keeping the idea at the back of their heads as something to be studied when it did not interfere with other matters, paid comparatively little attention to the question of weight. If the car came out a hundredweight or two heavier than had been intended—well, at the worst it meant a very slight loss in acceleration and, at the other end of the scale, a little more wear and tear on the brakes. In aircraft and aircraft engine design (the latter more particularly as regards this argument, for the motor-car firms have been responsible for the bulk of the air motors) such wide latitudes are unthinkable. A hundredweight or two would mean that the aeroplane could only take one man instead of two, or possibly that it would refuse to fly at all. Hence in the present day car there is evidence of a far greater realisation of the importance of weight, and this brings one to a consideration of one of the outstanding 1920 tendencies. It is dealt with first, because it is thought to be, of all points, the most important, although it may be said that it is the least likely to be noticed after a cursory glance at the exhibits. We refer to the ratio between horse-power and weight.

WEIGHT PER HORSE-POWER.

At the last motor exhibition an engine almost entirely composed of aluminium would have, quite justly, been described as a freak. To-day it is very nearly a commonplace. Next year it will, in all probability, be the rule rather than the exception. The use of aluminium alloy for cylinder jackets, pistons, clutches, brake-drums, shoes, back axles, propeller-shaft casings and so forth has enabled pounds of weight to be eliminated and represents a step forward in progress of the greatest possible moment. is one of those investments, as it were, that pays enormous compound interest. From the owner's point of view it means that the car is far and away more economical to run both in point of depreciation and of the supply of the material, such as fuel and tyres, which are consumed in running. We use this last expression deliberately in order to convey an idea, for it is not generally realised why the lighter car should tend to suffer less in depreciation by

In addition to petrol and india-rubber, metal—the metal of which bearing surfaces are composed—also constitutes a material which is consumed in running. It is consumed as a result of the wear and tear; and its consumption, which has the effect of making working parts increasingly slack, leads to still further wear and tear, to noise and to general loss of efficiency. In other words, now that the season model" is almost entirely a thing of the past, depreciation is a function of the actual amount of metal consumed in running from the bearings. This consumption (it may be taken that the average speed of 1920 motoring will be sensibly the same as that of 1914, in this country at all events) is dependent upon the stress to which the parts in question are submitted, and other things being equal such stress is directly dependent upon the weight of the moving parts, and, indeed, upon the weight of the chassis as a whole. The less the weight, the smaller the stress, and the smaller the stress the less the wear and tear. From which it follows that the lighter car must necessarily have a greater durability than its heavy predecessor of similar power and performance. At the same time it will be con-

siderably less costly to run.

A good instance of the cumulative benefits of lightness is seen in the case of the aluminium piston, which is a typical feature of modern car design brought into general use purely by aircraft influence, for it is its employment in aircraft that has caused the science of light metal alloys to make such wonderfully rapid strides. The aluminium piston, in the case of a four- or eight-cylinder engine, gives rise to a better degree of running balance and absence of vibration, as compared with a piston of greater weight. In any engine its introduction is accompanied by distinctly better powers of acceleration, simply because its inertia is smaller. This in itself is a considerable advantage, inasmuch as inertia counts most in that part of the car which is moving at the highest speed, namely, the engine. To reduce the weight of the piston is better, from the point of view of increased acceleration, than anything else short of altering some part or other of the design. Again, the ability of the engine to go on giving its power during a long life can only be secured by the maintenance of an adequate fit between the piston and the cylinder. Wear, of course, is bound to take place between these parts and cannot possibly be entirely eliminated, but a considerable amount of this wear is due to the weight of the piston, and, celeris paribus, the whole is smaller with a light piston than a heavy one. Not only so, but other effects take place in another direction still. In the wear and tear upon big-end and crankshaft bearings, the principal agency is the piston weight. The less this is the longer will the engine run without requiring expensive " re-bushing."

On the level road reduction of chassis weight in general, especially rotating weight such as brake-shoes, promotes liveliness in response to the opening and the closing of the throttle, and this in itself permits a better average speed to be maintained without necessarily affecting the ultimate speed. On hills the result of lightness is most noticeable of all, for in these circumstances the power of the car is partially absorbed in lifting its own deadweight. The greater lightness of axles which can be attained with aluminium alloys of the modern kind reduces the proportion of unsprung weight and considerably simplifies the problem of providing a satisfactory suspension equal to all kinds of

roads, loads and speeds.

The increase of the ratio between horse-power and weight has not only been contributed to by chassis weight reduction, but by improving the power output of engines by employing higher rates of revolution and better means, such as overhead valves, of filling the cylinders with gas. These higher speeds, in their turn, are only to be attained without risk of damage because the parts involved are lighter and stronger than ever, thanks to metallurgical progress.

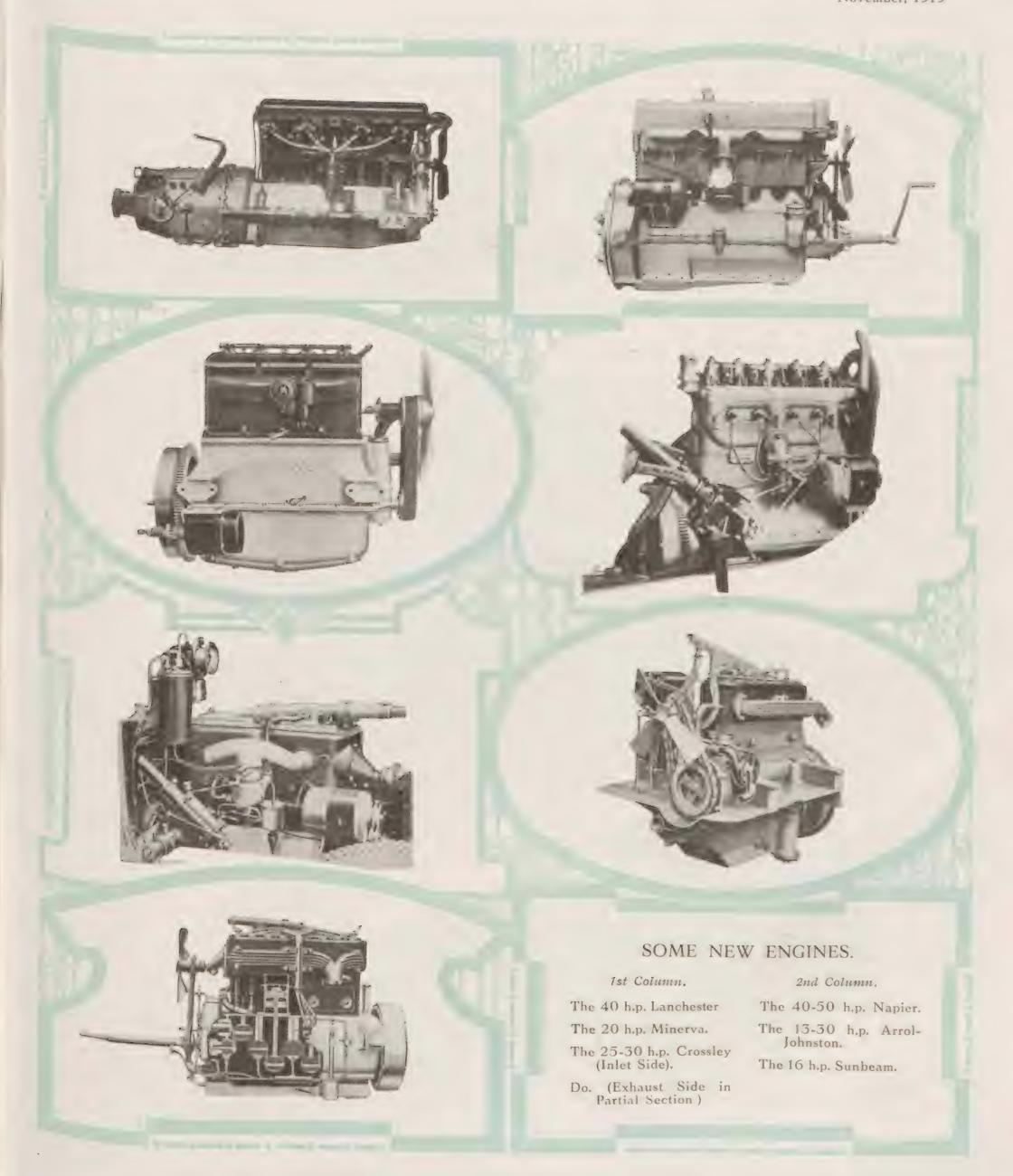
In our opinion the most notable and far-reaching tendency of the 1919 Olympia Show is represented by the phrase "horse-power per chassis weight." Had there been no other new development it would in itself have been sufficient to render the exhibition a milestone on the road

of car designing progress.

BETTER SUSPENSION.

Comfort on the car is of primary importance, firstly, because it is a measure of progress in the science of personal travel, and, secondly, because what is good for the human body is equally good for the more simple mechanism which the chassis represents. A perfect solution of the springing

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equation seems as far off as ever, but the practical compromise grows nearer and nearer the ideal. In this, reduction of unsprung weight plays a most important part, and it is a sound consideration of this, more than anything else, which has led to the very general adoption of the cantilever spring, in which the weight of the spring itself—by no means an inconsiderable quantity—is suspended, instead of bearing direct upon the tyre. Amongst the penalties which one has to pay for the enjoyment of motoring, and, above all, for satisfying one's self in regard to the allurement of speed, the principal is the cost

of tyres, and herein good suspension exerts a beneficent influence, for it is the function of the well-designed spring not only to insulate the chassis from shock, but to keep the tyres in constant contact with the road, whereby their own wear and tear is reduced, the efficiency of the brakes promoted, and steadiness in steering secured.

1.—The 15.8 h.p. Renault. 2.—The 11.9 h.p. Bean. 3.—The 15-20 h.p. Vinot. 4.—The 18 h.p. Buick.







ATTEMPT OF THE RESIDENCE OF THE REAL PROPERTY.

A welcome tendency, although at most it only amounts to a proper attention to detail, is seen in the general habit of furnishing the springs with weatherproof and oil-enclosing coverings. It is, perhaps, not entirely without interest to note that with the advent of the more scientific and enlightened treatment of car suspension the shock absorber of the old pattern, which was at best but a palliative and never a remedy for bad design, shows a distinct inclination to disappear. The elasticshackle type is, in any case, unsuitable for application to springs of the cantilever type.

CENTRAL CHANGE SPEED.

At the last Olympia Show, with not more than one or two exceptions, British, and in fact all European, cars showed unanimity in using the side position for the change-speed and brake levers. This year the central position is almost universal, and its adoption will be looked upon with general approval. The fact that it results in the driver having easy access to his seat without disturbing the front passenger is an incidental advantage not to be lightly dismissed, but the real reason

for supporting this example of American car designing policy is that in a central position the gear lever and its operating mechanism is easier to make and cannot be affected by frame distortion. It also results in a material saving of weight. There are still plenty of laudatores temporis acti who object to the central gear and brake levers, but by the end of next year an appreciable number will doubtless have undergone a process of conversion if they eventually come to find that the new system of left-hand control is just as easy and soon comes as instinctively as the other.

THE SAVING OF LABOUR.

It is something that after all these years the electric enginestarter should have become a sine qua non in motor-cars of every

1.—The 11.9 h.p. Zephyr. 2.—The 14 h.p. Angus-Sanderson. 3.—The 20-30 h.p. Cadillac. 4.—The 29.4 h p. Paige-Detroit.





type. A few makers still have the hardihood to quote it as an extra, for the fitting of which proper provision has been made, but the rule is that it is there as an essential component, not adapted as a makeshift after-thought, in which the car manufacturer took neither interest nor responsibility, but as much a part of the chassis as the carburetter. Here and there one finds a mechanical tyre pump, but this is about as far as the most enterprising designer will go in the direction of

labour-saving contrivances. He does not as yet, it would appear, see any approved means of making the job of jacking-up any cleaner or more pleasant, although pioneers in the accessory world are already in this promising field. At the same time, from the owner-driver's point of view (and even the largest of large cars is very much intended for this great class of motorists), the less obvious labour-saving devices have been by no means neglected. It is, in fact, possible to say that in ordinary circumstances an owner can clean his own car without great difficulty. Its "hull" is of smooth outline, it is pleasingly free from finger-bruising excrescences, and bright parts are reduced to a minimum.

Detachable rims serving the dual purpose of providing rapid tyre change with ease of tyre fitting are being regarded more and more as a thing that should be on the car to start with, not fitted to it afterwards. In several notable makes the intention is embodied of easing the owner of the



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responsibilities of occasional lubrication. This is a step in a most admirable direction which cannot but be attended with the most beneficial results all round, as from the owner-driver's standpoint the grease-cup is an abomination and a reproach. Ultimately we shall have cars carrying but a single supply of oil for the lubrication of every moving part; indeed, that point has very nearly been reached to-day.

DETACHABLE HEADS.

One aspect of the labour-saving idea which is of particular importance is the detachable cylinder-head, which is already standard practice. Only crass ingratitude could deny that this very convenient point of construction owes its widespread popularity to Mr. Henry Ford. Its beauty is that it materially reduces the time during which a car need be out of commission for the purpose of having, as it were, a "shampoo," as with the up-to-date head no lifting of cylinders is necessary and practically no skilled labour called for; yet the work of decarbonising can be thoroughly carried out in a short time—a considerable advantage, whether the work is done at home or at the repairer's. It may be remarked that in this matter we have a good instance of how persistence will overcome prejudice. The detachable head of to-day employs neither material nor method that was not available a few years ago when the great majority of automobile engineers flouted the idea. Yet here it is materialised in full, and a triumph for that sound common-sense which is the soundest basis of true engineering practice.

COMPLETE EQUIPMENT.

For many years the European car-maker showed a disinclination to equip his car with accessories that the greater number of motorists have always regarded as necessaries. Force majeure has impelled him to fit either detachable wheels or detachable rims and electric lighting and starting, for these are to modern ideas strictly necessities. A wise consideration has persuaded him to go further and entertain the conveniences of clocks and speedometers. The speedometer, be it noted, is now an integral part of the chassis, as it always should have been, furnished with a proper form of drive and mounted on a proper form of dashboard. By adopting it as a standard fitting the manufacturer has, perhaps unconsciously, paid himself a compliment, for the speed indicator is the more necessary as the pace of the car is less proclaimed to the driver by its noise, vibration and fuss. What was once an object of curious interest is there now as a valuable preventive of misjudgment.

OVERHEAD VALVES.

The adoption of overhead valves as a regular feature of touring car design is an important 1920 characteristic which owes its existence to aircraft influence. The prejudice which formerly obtained against them on the score of noise has disappeared owing to the availability of suitable material, which can also be relied upon not to break, and it is now made clear that, given good design, the overhead type of valve, with its greatly enhanced efficiency, need be no noisier than any other kind. Not only does it permit the cylinders to fill themselves more completely at high rates of revolution, and increase the percentage of fuel usefully burnt, but in leading to a more symmetrical disposition of material it obviates the troubles due to distortion of the cylinders and heads under heat. It is therefore a valuable contributory to long life, in which connection it has still another advantage—namely, a direct action which results in the reduction of reciprocating weight.

DISC WHEELS.

The general use of disc wheels is unquestionably a good move in the direction of labour-saving, and there will be but few who would oppose it from the æsthetic outlook. Possibly the principal reason behind their standardisation, for such it may be almost called, is a consideration of appearance, for it is to be questioned whether, in the ordinary way, any saving in weight has been as yet effected. The possibility of this object being also served is not to be overlooked, but its realisation to a material degree can be left to the—one hopes—immediate future.

REAR BRAKES.

The countershaft foot-brake has by no means disappeared, but it would appear to have lost a good deal of ground. Whether this tendency to put both brakes direct in the back wheels, an importation from the United States, is to be welcomed remains open to question, but it is quite certain that a large number of motorists will regret the inability to "stamp" on the car, in case of need, which the original type of foot-brake gave them. The double rear brake is a consequence of the demand for greater production economy, as it is manifestly the most simple arrangement possible, but it has the disadvantages of leading to a slightly slower brake action, of reducing the area of brake drum available for cooling, and of enhancing the unsprung weight. Of these, the last-named objection is the most material, but it must be admitted that the combination of double rear brake with cantilever springs leaves the axle weight pretty much as it was before. It is noteworthy that no important British firm has standardised front-wheel brakes, although they are essentially a British invention. In view of the fact that they are included in several advanced Continental designs this fact is somewhat singular.

Where the countershaft foot-brake is retained, the adjustment is generally now made so as to be carried out from the driver's seat. A very admirable convenience this, which appears to be a product of racing experience.

EIGHT CYLINDERS AND SIX.

The eight-cylinder principle is slightly increasing in popularity, and the six-cylinder very distinctly so. A few years back one would have been inclined to prophesy that by this season twelves would have been common, but the promise they held out does not appear to have been realised. It may, however, be observed that sixes would have been even more common than they are had not lighter and stronger materials for reciprocating parts been developed, as owing to these the balance of the four-cylinder is considerably improved.

VACUUM FUEL FEED.

The rapid disappearance of the old pressure fuel-feed system is a development which will be much welcomed. The "Autovac" principle, whilst enjoying the same advantages as the other, has several of its own to support it, being safer, simpler, and far less prone to irritating derangement.

FINISH.

The fact that the preponderating finish for cars is now nickel instead of the once favourite brass will not escape attention, and is, in our opinion, a distinct advance. It is certainly a sop to the owner-driver who desires to waste the least possible labour on having his car kept presentable, as even under gross neglect nickel never tarnishes to an intolerable extent.

BODY IMPROVEMENTS.

We have referred already to the co-operation of chassis and body departments which has led to the appearance of the complete car being enormously improved, and great progress has also been made in the direction of detail. The much-needed adjustable front seats are well represented; rear passengers are better protected from weather; hoods are apt to be properly enclosed in wells when out of use; batteries are neatly stowed; running boards are kept clear; and spare wheels and tyres are quite generally furnished with suitable accommodation, out of the way of dust and mud, and, above all, out of sight. In a word, the fully equipped car has at last become really pleasing to the eye.

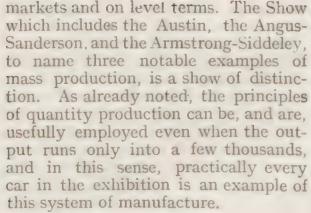
QUANTITY CARS.

The 1919 Olympia Show marks an automobile epoch in this country by synchronising with the production of the British Quantity car, with which the industry can for the first time hope to compete with that of other nations in the world's

1.—The 12 h.p. Swift. 2.—The 20-25 h.p. 6-cyl. Straker-Squire. 3.—The 20 h.p. 8-cyl. Guy. 4.—The 13-30 h.p. Arrol-Johnston.



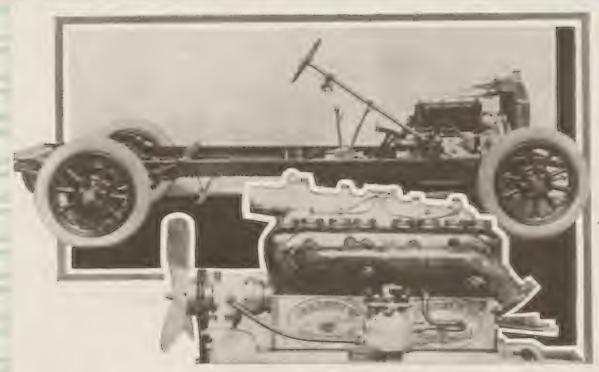






LUXURY CARS.

The large number of comparatively big and high-priced cars can hardly escape observation, even allowing for a new scale of figures to accommodate a new value in currency. It is evidently an article of faith that there is plenty of room at the top, although the lower branches of the tree would appear to offer a more secure perch. The evolution of motor-car design—or perhaps we should say, of motor-car designers—seems to lead everyone to break himself in on the small car, and then to go on making it bigger and bigger. To a great extent this is perfectly natural and not objectionable; yet it would appear that the design of a satisfactory car of moderate size and low first cost is in reality a greater achievement than the attainment of a high degree of perfection in a vehicle in which cost has scarcely to be considered. The percentage of effort in the auto-



CHASSIS AND ENGINE OF THE 15.9 H.P. HUMBER

mobile industry which is devoted to the production of luxury cars has now, one thinks, reached its useful maximum, if it has not actually exceeded it.

The 1919 Olympia Motor Show will be characterised by such a tremendous volume of practical originality, designed to promote not only greater luxury and convenience in motoring, but also to enhance its economy, that it is indeed difficult, not to say invidious, to pick out representative examples of automobile development that should not be missed.

Very few stands indeed will be suggestive of mediocrity, and rare indeed will be the cars which fail to offer points of

Amongst the big luxury cars—a class of vehicle which, this year, seems to be more numerous than ever—the new Napier calls for special mention. With its aluminium engine and overhead valves—principles which this firm have well tried out in their "Lion" aircraft motor—it is a splendid example of scientific weight reduction and the attainment of extraordinary efficiency. In this particular case the advanced design of the engine has effected a weight saving in that part of the chassis alone of nearly

2 cwt. By such means, and without any sacrifice of smoothness, silence or docility, great powers of speed and acceleration have been achieved, and economy in running, both in respect of fuel and tyres, should be most marked. This new Napier chassis, by the way, has the distinction of being the highest-priced British motor vehicle ever offered to the public. In the big Napier touring car we see, for the first time, the rear passengers provided with as much consideration as those who occupy the front seats, for they have, no less than the latter, a comfortable scuttle dashboard and a properly arranged wind-screen to protect them from the weather.

In the Rolls-Royce it was hardly to be expected that any radical changes of design would be found, but an engine-starter now forms a part of the standard equipment, and the fitting of this, which has long been awaited, will be inspected with considerable interest.

The new Lanchester, with its engine under a bonnet of more or less conventional type, shows the application of the most characteristic principles of design. The six-cylinder engine has entirely enclosed overhead valves, operated by a worm-driven overhead camshatt. A new type of plate clutch is employed, and a three-speed epicyclic gate-controlled gear-box forms a single unit with the engine. It is worthy of note that whilst the Lanchester cantilever springing is retained for the rear axle, ordinary underslung half-elliptics are used in front.

An interesting newcomer to the ranks of high-powered British vehicles is the Ensign. In this case the cylinder jackets are of aluminium surrounding cast-iron liners; the cylinders are in pairs, but the detachable head, which covers all six, is in a single piece, and carries the overhead valves and the overhead camshaft, which is driven by worm gearing. The gear-box and clutch

form a single unit with the engine.

Two magnificent French importations, which deserve the closest possible study, are the Hispano-Suiza and the Delage, both six-cylinder productions and both fitted with systems of front-wheel brakes. The performances which these cars have put up on the road already indicate that they are likely to be formidable rivals of British cars in the luxury class. The overhead valve-gear of the Hispano, with its valves worked directly by the cams and without the intervention of tappets, is noteworthy, especially as this make was the originator of the system which it used in the famous aircraft engines.

As a powerful vehicle of medium price, yet of the highest quality, the new Armstrong-Siddeley may be described as practically in a class by itself. Throughout the design, which is full of originality, the makers disclose their intention to deal with problems on their merits and entirely unshackled by tradition. Here, too, is a case of a quality car being manufactured on a quantity basis. Interesting features of the design are the frame, which is strengthened and made rigid as well as light by being formed in one unit with the running boards, which are of steel. The six-







THE 29.4 H.P. CHANDLER.

manent casing is a very excellent point, and the housing of the magneto and the lighting dynamo in an easily accessible compartment of their own is much to be commended.

The designer of the famous B.R.2 aircraft engine—the only successful British rotary motor—has produced a most attractive car under his own name. The three-litre Bentley is characterized by intense efficiency, and in spite of the small engine dimensions, a four-seater car, loaded with passengers, is guaranteed to lap Brooklands at 75 m.p.h. There are four overhead valves to each cylinder, two inlet and two exhaust, and the weight of all moving parts has been scientifically cut down to the very minimum.

An interesting new car, which is also a new make, and, whilst on accepted lines generally, has nevertheless many features of much importance, is the 16-20 h.p. Ruston-Hornsby. Its specification includes the Marles patent steering gear, in which the usual worm and segment device has its place taken by a pair of simple cams and ball bearings, giving an almost perfectly frictionless action.

No one will fail to inspect with the closest attention the two great British "quantity" cars, the Austin and the Angus-Sanderson, the former being made under one factory roof, whilst the latter is the product of a number of component firms co-operating together. It may be remarked without invidious intention that, whilst the Angus-Sanderson, in pursuing this policy, has adopted a definitely American principle, the Austin shows strong transatlantic influence in its design. A feature of the Austin is the tour-speed central-controlled gear-box. Rated at 22 h.p., the engine, which has detachable heads, is 95 × 127 mm. bore and stroke and embraces the unit power plant construction principle. Very excellent points of the standard Austin bodywork are the use of a completely concealed hood, which is accommodated in a hidden well when out of use, and the fitting, in the rear panel of the body, of a dustproof cupboard which accommodates the detachable wheel.

The Angus-Sanderson car is full of brilliant features, of which the cantilever rear-springing is not the least noticeable, but the automatic lubrication of almost every part is a thing which will make a strong appeal to most owner-drivers. This is carried out in a very sound and thoughtful manner; for instance, the lubricant (ordinary oil, not grease) which is filled into the back axle casing is led direct to the brake-operating rocking-shafts, in addition to other

parts. The engine has a bore of 75 mm. and may be described as of the high-efficiency type, having a wide range of useful speeds and a remarkable maximum b.h.p. Aluminum pistons are used, and the cylinder-heads are detachable. This car is produced on the component-built principle, that is to say one factory makes the engine, another the gear-box and transmission, etc., and so on. It has to be admitted that the result is very admirable.

A new name that is likely to make itself more familiar is that of Varley-Woods, which is identified with a high quality 11'9 car in which there is no lack of up-to-dateness. An overhead valve engine, 69 mm. by 120 mm., with aluminium water jackets, iron cylinder liners and detachable heads, a Ferodo-lined clutch, and a four-speed gear-box are features, and a note of originality is struck in the rear suspension, in which long cantilever rear springs are fitted, but are relieved of torque stresses and partially of driving stresses also by the employment of a separate radius member pivoted at the rocking-pin of the spring.

Amongst the larger and established four-cylinder models are several famous names, the three chief of which have, singularly enough, not undergone much change of design, though they have all done wonderful work during the war. The 25 h.p. Vauxhall, the staff car par excellence, is improved in appearance and in many details, and is an admirable type of British high-class automobile engineering. The bodywork of these cars appears to be worthy of special praise, not only because it is eminently handsome, but also in that the rear passengers have received proper consideration. The Sunbeam 16 h.p. is much the same as the War Office model, except, of course, that it is now fully equipped with electric lighting and starting. The feature of sliding front seats in the standard four-seater car is retained, and of this excellent point the Sunbeam was, we believe, the pioneer—may it be copied by many others. The new six-cylinder Sunbeam is on similar lines to the 16 h.p., and has the same cylinder dimensions, namely, 80 by 150 mm. Whilst being amply powerful for closed car work, this chassis should make a strong appeal to the sporting motorist who wants plenty of speed with comfort.

The smaller Crossley model, which appeared at the last Olympia, has been dropped entirely in favour of a concen-



tration upon a single model—the 20 h.p. "R.F.C." with its four-inch engine. Only detail modifications have been made, aside from the standard electrical equipment, and of these the most striking is the new radiator, which is Vee-shaped and a larger reproduction of that used on the Shelsley-Crossley car. The bodywork appears to have received the attention it deserves, and the standard phaeton, with its "streamline form," roominess, and convenient locker accommodation behind the front seat is much to be admired.

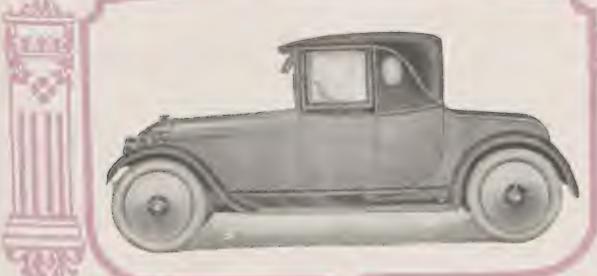
The eight-cylinder principle, for reason or other, does not seem to have appealed to British manufacturers, though it is becoming more and more popular in France, and is by no means losing ground in the United States. The only entirely new British car with eight cylinders

1.—The 40 h.p. Lanchester. 2.—A Wolseley Coupé. 3.—A De Dion Coupé Cabriolet. 4.—The 12 h.p. Secqueville-Hoyau.

is the Guy, but a partially British









make is the Talbot-Darracq "eight," which is of surpassing interest and full of good points. A new French "eight" is the Piccard-Pictet, and the Cadillac of America is more firmly established than ever.

On the other hand, more than one light car maker has embraced the six-cylinder principle, notably the A.C. (although this firm is still continuing its four-cylinder 10 h.p. model). The new "six" is rated at 12 h.p. (65 mm. by

no mm.), has cast-iron cylinder-liners pressed into an aluminium monobloc casting (with two exhaust pipes) and has a single cast-iron detachable cylinder-head. The rear-springs are quarter-elliptic, and a feature of this design is the overhead worm-driven rear axle which incorporates the three-speed gear-box.

A light car which is really a little larger and more commodious than the typical light vehicle is the Bean, which, known formerly as the Perry, is now made in very large quantities by one of the largest munition-manufacturing firms in the Midlands. The design is conventional, but the breaking away from convention is no proof of excellence, and the Bean is an admirable example of sane and well-tried principles properly applied. A similar remark applies to the Swift and Hillman cars, each of which is thoroughly representative of the best British practice. One notes that in the latter case a sporting type, in which the efficiency of the little engine is

increased to its limit and a very light and low body is fitted, will be available in small quantities.

The two Humber models are also especially worthy of mention. The popular 10 h.p. chassis has been improved in detail and is now fitted with a single unit starting and lighting set, while the 15 h.p. is a new model of interesting and sound design.

The new Enfield-Allday cars are sure to attract much interest. The larger is a six-cylinder vehicle of medium



THE GRAHAME-WHITE BUCKBOARD.

size with a great many novel features, but the smaller is in respect of originality almost in a class by itself. It has a five-cylinder radial-engine, air-cooled and fitted with a novel and practical form of valve gear in which cylinder-head distortion is entirely prevented. The frame is also of a new type and altogether unlike the usual construction; the steering wheel hinges for facilitating access to the driver's seat, and the suspension all round is by full cantilever springs. Other air-cooled cars, which are here to stay, are the A.B.C. twin-cylinder horizontally-opposed (four-speeds), and the Cosmos (three-cylinder radial). Both of these are directly the creations of aircraft-engine makers, and the chassis show the reduction of weight carried to a remarkable point.

Another instance of a British aircraft engine firm entering the motor-car industry is found in the Beardmore cars, of which three models are being made upon conventional lines. The Grahame-White Co. also disclose an intention to descend to earth to good purpose with their new 10 h.p. four-cylinder light car, and also with a "buckboard" of very low price and power. The firm of Adam, Grimaldi & Co., well known as constructors of aeroplanes, are responsible for the Albert car. This is a small high-efficiency four-cylinder of "Rolls-Roycey" appearance, amply powerful to take the four-seater body which has been standardised. In this chassis one finds the rare combination of full cantilever springs in the rear, with half cantilever or grasshopper springs in front.

In a similar class to this last are found two other makers whose names are quite new, but whose products are by no means those of the neophyte. The Zephyr car is made by a firm which was one of the first to cater for the demand for light pistons, and it is in connection with their components fitted to innumerable racing cars that the name is best known. The other make is the Dawson and hails from Coventry. With its overhead valves, this four-cylinder

engine is conservatively rated at 11'9 h.p. The chassis is on accepted lines, but is characterised by great refinement in detail.

Daimlers have discarded the four-cylinder principle in favour of the six in their new 30 h.p. models, which are made in both "light" and "standard" form, the "light" chassis being especially suitable for sporting work. An interesting feature is that the gearbox is now mounted upon the frame, in contradistinction to that of the 20 h.p. which this new chassis displaces, and that \(^3\)-elliptic rear springs are fitted in place of the previous cantilevers. The Daimler radiator has been much neatened in appearance by the radiator cap being put underneath the bonnet lid, whilst the characteristic "comb" is level with the latter instead of standing "proud" to it.

Straker-Squire are new entrants to the six-cylinder class, and use separate cylinders. The same applies to Scripps-Booth. Other new American importations are the Paige-Detroit and the Chandler, the latter a high-class six-cylinder of more than usually European appearance.

Amongst French importations a special word may be directed to the 17-50 h.p. Gregoire-Campbell, which is described as a super-sporting vehicle of a high efficiency type, the vogue of which is greatly on the increase.

Turning to cars originating in other European countries, we find a striking Italian production in the new twelve-cylinder Lancia. This is an intensely interesting design in which two rows of six cylinders in each are placed at such a narrow angle (22°) that the appearance is that of a rather fat six-cylinder engine, the whole being, of course, perfectly balanced. Engine, clutch and three-speed gear-box form a single unit. The rear springing is novel, as it incorporates both the cantilever and the half-elliptic principles. It will be interesting to see the future which awaits this first of standard twelve-cylinder cars in Europe; certainly the design appears to be unusually brilliant.

Also among the Italians the new Bianchi, with its gearbox on the propeller-shaft casing, is an attractive and sound design.

In former years Olympia showed a goodly number of Belgian cars, but this year the only one to be seen is the Minerva, which is as beautiful a car as ever, and indicates in the best possible way that a stricken country is at work again.

In the accessory section there is evidence of plenty of enterprise in all departments, but in connection with equipment, such as electric lighting installation, speedometers and so forth, interest is somewhat diverted by the fact that practically every make of car incorporates these fittings in its standard equipment. In the tyre section it is almost unnecessary to say that the Rapson "unpuncturable" will be the centre of attraction for all that, in other places, it may have been temporarily the centre of detraction. The interest that is being taken by all classes of motorists in this tyre clearly indicates the importance of the development it represents, and that whatever else may be said to the contrary, tyre troubles and their elimination are of the closest concern to all who use cars. Many of the pneumatic tyres, notably the Dunlop, are made in improved forms of tread, there being a general tendency, not altogether dissociated from American influence, to go in for all-rubber rather than steel-studded covers. The Warland Dual Rim is now made in conjunction with a very neat form of disc wheel, and both this and the Rapid Rim show by their popularity that, with the expansion of the owner driver type of car, ease of fitting new covers, and detaching old ones, is an important consideration.

"And Never the Twain Shall Meet!"



SALESMAN (AT OLYMPIA): "CAN I CALL ATTENTION TO OUR CAR, SIR?"

MR. EAST-END: "ME AN' MY MISSUS WAS TOLD TO LOOK OUT FOR A LIMEHOUSEEN WITH STEPNEY TRIMMINS. IS YOURS ONE OF 'EM?"



Mere Woman at the Motor Show.—By CHRISTOBEL NICHOLSON.

HE forthcoming motor show at Olympia will be unique, from a feminine as well as a masculine point of view, in the history of motoring.

In days gone by the majority of women visited Olympia to please their male belongings, or because they thought it sporting to feign interest in matters mechanical of which they were totally ignorant. But the old order has changed.

Many mothers, when asked the obvious question as to what they did in the Great War will reply:

"Learned to distinguish a magneto from a piston, my son."

Women now regard motoring with interest born of knowledge, and will attend Olympia to criticise intelligently, question intelligently, and therefore to buy intelligently.

Even the best ordered brains, however, are apt to become untidy under stress of excitement, and it is my object to try to collocate a few facts as to the points which must be considered carefully before the purchase of a car.

In ordinary circumstances the engine is the main object of interest to the future car-owner, but this year's show is not an ordinary occurrence. 'Up to the present most post-war models have led a catalogue existence; and, after all, what is a catalogue but a collection of pretty

pictures, columns of figures and theoretical statements galore? Heaven be thanked, though, for safeguarding us in one way—motor manufacturing is a competitive business, not a State concern.

Some makers achieve a reputation, others have a reputation thrust upon them. Those who come under the latter category should be left severely alone, for the only reputation which is forced upon any-



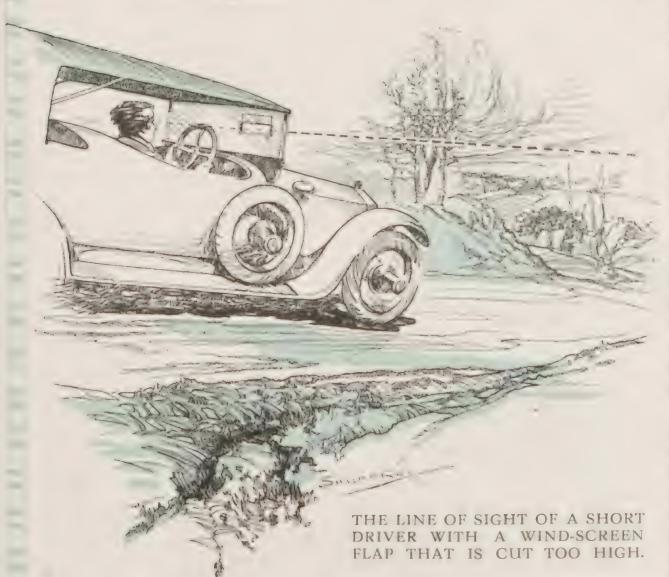
"VERY LIGHT COLOURS . . . DEVELOP TAR-POX AFTER A RUN OVER A NEWLY MADE-UP ROAD."

Purchasers will have to trust to luck so far as the engine is concerned, and should therefore choose the product of a firm which has proved its worth. Of course it looks well to lift the bonnet when making inquiries about a car, but four, or even six, cylinders in repose are about as com-

municative as a civil servant. They give away no information. Coachwork, fittings, and general accessories of the car are items which can and must be examined critically.

DRAWING A (STREAM) LINE.

First in importance comes the question of design. Draughtsmen are like Euclid; they



spend an enormous amount of time and energy on inventing extraordinary problematical novelties. Euclid was, however, an honest old man. Having ground his pupils' brains to pulp, he told them to cease worrying because the problem was "absurd." Designers of motor bodies never admit the absurdity of their work; on the contrary, they try to make money by creating a fashion.

The vogue of the moment is "streamline" and "sporting." Everything, even comfort, must be sacrificed to obtain this end (national characteristics will come out), and the result is

not always as it should be.

I once drove a catalogued four-seater, the back seat of which was a tight squeeze for two skinny beings, and when my grandfather—14 stone and gouty—tried to alight from a recumbent position he said—but that is another story.

So the purchaser should beware.

Before the car is finally selected, the seating accommodation, especially that of the driver, should be tested for practical comfort. When a maker chooses a certain body (N.B.—This has nothing to do with a post-mortem) for his chassis he gauges the length from seat to

dashboard, the height of the seat, and the rake of the steering to suit the average sized driver.

Now the motor manufacturer is a conservative individual. The first car-driver was a man; therefore the designer caters for men; and many women may find themselves in difficulty through not being able to reach the pedals. Some makers have condescended to acknowledge our emancipation by fitting a sliding front seat which can be adjusted to meet every requirement; but, even so, the steering column and wheel are fixtures, and as such must be given due attention.

The position of the hand controls as well as of the pedals must be taken into consideration, and the only way to ensure that everything is as it should be is to sit in the car, leaning back against the cushion, with each foot in its respective position on the clutch and brake

pedals. When the pedals are pushed right home the driver's legs should not be stretched to their extreme limit, while the back of the seat should provide any support that is needed. (Thank goodness Queen Elizabeth is dead. Women possessed no legs in her days, and I could never have hoped to explain that point without referring to them.)

Perfect comfort means perfect accessibility,

which in its turn makes for safety.

Before the body design is passed as "O.K." the tool and luggage carrying propensities should be noted. The sporting element may have eliminated a luggage carrier, because it looks like Bournemouth instead of Brooklands.

THE COLOUR SCHEME.

Next comes the colour of the coachwork and upholstery. Women lucky enough to possess a chauffeur or chauffeuse have nothing to consider except the look of the thing; they make their choice, the driver does the swearing. An owner-driver should avoid very light colours, which show mud and develop "tar-pox" after a run over a newly made-up road.

Dark blue, dark green and medium grey are the most serviceable colours, and I think that dark blue, although it shows dust more than either of the other colours mentioned, will be first favourite. There is a warlike atmosphere about grey and green that will not please our khakisatiated eyes.

Leather is the best material for the upholstery of an open touring car, because it will wash. The tint will naturally depend on the main colour scheme, but dark blue and grey are inevitably superior for practical requirements.

WHEELS.

Unadulterated wire wheels are the invention of the devil so far as cleaning is concerned. Before

they entered my life I had some chance of qualifying for white wings and a harp; now, all is over. However, I must be honest and own to their undoubted superiority in their sphere. No artillery wheel made will stand up to such rough treatment as a wire wheel, because in its very devilry, the number and arrangement of the spokes, lies its strength.

In addition to this, it will always win the day in a wheel-changing competition by reason of the simplicity of its attachment, which consists of some form of locking ring on the axle hub. There is only one thing to be undone, as against the numerous bolts and nuts with their attendant spring washers which hold an artillery wheel in position. The one great disadvantage of wire wheels can be overcome very easily by the addition of discs,

and a tangent-spoked wheel, adulterated in this way, is strong, neat, quickly changed and easily cleaned.

WIND-SCREENS.

I think that Omar Khayyam must have been thinking of wind-screen inventors when he spoke of hearing great argument. The controversy on the subject of this car fitting arises from time to time like a Phœnix, and when all is said there is nothing done worth consideration except in one instance. I refer to those screens which are made with small, letter-box flaps which can be opened or shut at will.

The object is to enable the driver to obtain a clear outlook in wet weather, at the same time keeping the car water-tight from the front at any rate. But, as in the case of the front seat, the makers cater for the average-sized driver. Anybody who does not manage to hit off the right height will find herself confronted with a small metal rim right in the line of vision, which is most irritating.

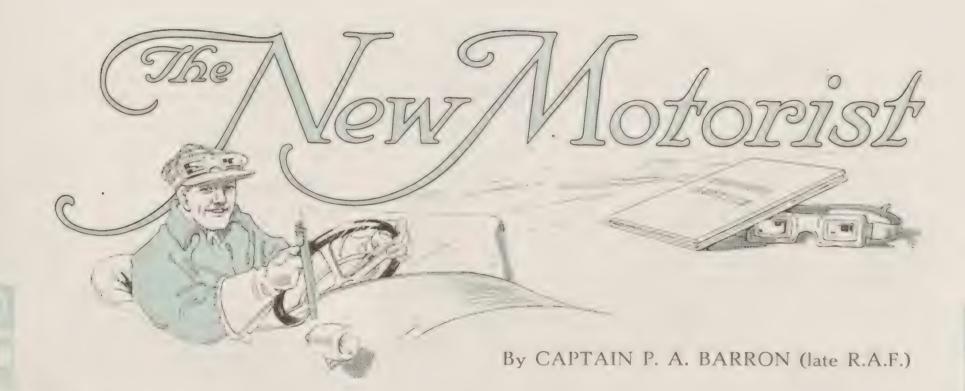
MAINLY ABOUT HOODS.

Talking of annoyance reminds me of hoods. There are few inanimate objects which are capable of giving so much mental and physical anguish as these contraptions. Of course they are not supposed to be inanimate. Their inventors tell us that one man, or one woman, has only to lift a graceful finger to show



wheels can be overcome very "THE DRIVER GETS A SOUSING AND SEVERAL PINCHED FINGERS."

what is required; "the hood does the rest." This is a delusion. As a matter of fact, the usual programme, when the heavens are unpleasant, is that the driver gets a sousing, several pinched fingers, blackened nails and a bad temper. The higher the price the fewer the attachments, and therefore fewer implements of torture, is the rule, and it is well worth the extra shillings to obtain a hood which can be quickly adjusted—sometimes.



HE first Olympia Show since the outbreak of Peace is certain to attract a very large number of would-be motorowners. During the war hundreds of thousands who formerly knew nothing about cars have been made to realise their practical utility. Thousands of ex-officers who have had cars at their disposal in the Services are already feeling that civilian life is almost impossible without them.

To be demobilised is all very well, but to be de-automobilised is to be spiritually dead.

Others who have not been in the Services have been waiting during the last four years and have been promising themselves the luxury of motorowning as soon as possible after Peace had returned.

It is those who have so far never known the pleasures that the possession of a motor-car brings that I intend to address. This is not an article on differentials or lubricating systems; it is an attempt to achieve the impossible task of making non-mobile persons realise the joys of automobilism.

In the beginning a person usually buys a motor-car because he or she thinks it will be a convenience. It will be useful for transport duties between home and the golf club, the tennis club, the theatre, the houses of friends, the club or the shooting party. So far the romance of motor-owning has not been revealed. The car is a mechanical beast of burden, not a magic carpet.

But this stage of ignorance does not last long. In a few weeks, if the new owner of a car is a normally constructed person, such mundane matters as golf, lawn-tennis,

theatres and other formerly attractive vices will be forgotten. An entirely new life will have begun. For the first time the owner of that creature of metal and rubber which at a touch palpitates with life finds that he is free.

He may have been made a Freeman of his City by civic dignitaries, but the engineer has made him Freeman of the Country.

Our England is a garden that Is full of stately views,

and it is his to enter and enjoy.

Other things pall; motoring can never become stale. It arouses the spirit of adventure; it stimulates the *Wanderlust*; it gives one a sense of power. He who has been accustomed to think in towns begins to think in counties and finally in countries and continents.

The first tour is a revelation. Until one has experienced the joy of starting off early on a summer morning with a sufficient reserve of petrol to make

"USEFUL FOR TRANSPORT DUTIES BETWEEN HOME AND THE GOLF CLUB."

one independent of garages, and with adequate luncheon and tea-baskets, one has not really lived. With a car that will travel at any speed between three miles an hour and fifty or more, with fuel that gives it a cruising



"WITH A SUFFICIENT RESERVE OF PETROL."

range of more miles than one would care to travel in a day, one has a feeling of complete detachment from the cares of life. One leaves

troubles behind, and they can never overtake a modern car. The mind of the driver is pleasantly stimulated into alertness by the dangers of the road that lurk at every bend and crossing. No enthusiastic motor-owner cares to be driven. The real joy lies in the feeling of power that he has over the mechanism that has given him an unlimited playground to enjoy.

After breakfast he and his passenger glance at a map. Perhaps he says, "By Jove! we are only 40 miles from Haddon Hall. I've often wanted to see it." Less than two hours

after they are in the home of Dorothy Vernon, who must have loved very much indeed to have eloped from such an entrancing nest.

Again the map is consulted. There is all England to play in, or—why not Wales? Mountains, lakes, waterfalls—it sounds alluring.

Once more the car rolls along white ribbons of road that are tunnelled through forests, ruled

across wind-swept moors, never ending, winding, tempting one on and on with promises of fresh beauties round every bend.

Towns of black and white timbered houses unchanged since the days of Queen Elizabeth, villages that slept from the time the last stage-coach ceased to compete with railways to the days when science brought them into men's ken again by the introduction of the motor-car. Woods cool, green, golden-carpeted, dappled with shifting gleams of sunlight; lakes, hills on which tall trees look like moss; rivers ruffled by the wind, and all that the world has to give her lovers!

The motor-owner may lunch in a forest of English oaks and

brew tea by the side of a water-fall in Wales. Derwentwater, Ullswater, Windermere, Loch Lomond—these to him are not mere names;



"A HOOD THAT DOES NOT REQUIRE THREE MEN AND A BOY TO ERECT."

he knows them all. He becomes an epicure in beauty.

And as time goes on his ambitions grow. The



"HE MAY
DROP
DOWN A
WINDING
PASS . . .
AND A
NEW
WORLD OF
ROMANCE
IS HIS."

mountains and lakes of Scotland remind him that there are greater mountains and bluer lakes in Switzerland and Italy, and during the next holiday he will speed over the straight-ruled roads of France, between the poplars shaven almost to the tops, till he sees the white Alps heave their gleaming peaks above the horizon.

On a car that seems to enjoy gradients that give it the opportunity of showing what it can do, he will pass the tilted meadows flushed with Alpine roses, with the dazzling purity of the snow above—peaks of infinite beauty etched against a sky of violet. He will see trumpetshaped gentians and a thousand flowers that are new to him. He will hear the avalanches snoring forty miles away and watch the white mountains change at sunset to lemon, orange, red, and then to smouldering crimson, while the stars Prick their way through the velvet night.

He may drop down a winding pass, praying that his brakes may be as efficient as their makers claim, to the plains of Italy, and a new world of romance is his.

Verona, where Juliet's home will be shown to him, sans garden and sans balcony, and Juliet's tomb—an open stone coffin filled with visiting



cards of people from all parts of the world, from Ohio to Japan. Milan, with its miracle of architecture, Venice with its pink and white Doges' Palace mirrored in the blue of the Grand Canal—they are all his to enjoy.



"BY THE SIDE OF A WATERFALL IN WALES."

Time can never stale the joy of the motoring To him there will always be enthusiast. pleasures that are new or that can be renewed. He may adventure into the Southern States of Europe, into the troublous Balkans, among picturesque ruffians in sheepskin jackets embroidered with spectrum-hued silks, and learn what kind of people are these who have caused so much trouble in Europe.

He may roll his tyres over the Pyrences and onwards to the bumpy, cactus-bordered roads of southern Spain; see the fairy palace of the Moors at Granada, a jewel-box of colour close to the white peaks of the Sierras. He may once. —and once only—see bulls goaded by torture into fighting for their lives, which are already forfeit, with men who make them vent their fury on decrepit horses, who thus end lives of faithful service.

Scenes sad and gay, beautiful and sordid, pass the eyes of those who live in an age that has given them the magic carpet of the "Arabian Nights." It is a gift that each man may use as he wills; but, to one who has a spark of adventure and love of the world in which it is his privilege to live, it is the means of making his dreams come true.

The would-be motorist may think that only very high-priced cars would do the work hinted

at in these pages. That is not the case. Any modern car, even of the lightest type, is capable of taking its owner across Europe and back.

I am often asked by those who have never yet owned a "joy-wagon" for what features they should look when selecting one. This is a question that can only be answered by asking another:—" For what purpose do you intend to use it?" If the answer is "for pleasure touring," then I say, get a good sporting model with a hood that does not require three men and a boy

to erect. Choose big tyres—they are the cheaper in the end. See that wheelchanging is as easy as possible.

Petrol consumption is a matter of great importance in these days of high prices and heavy income taxes. Remember that you must pay for high power, not only in the

initial cost of the car but all the time you run it. Anything above twenty-five h.p. is not really necessary for any pleasure touring.



CARS THAT HAVE SEEN MUCH WAR SERVICE."

Cars that have seen much war service are to be relied upon. The war brought out the good and bad points of cars as it did in the nations who warred.



Many New Cars.—Unit Mounting Universal.—Increased Use of Aluminium.—Braking and Suspension Novelties.

(By OUR SPECIAL REPRESENTATIVE.)

HE first automobile show in Europe for nearly six years has been held in Paris. Many doubts were expressed as to the possibility of holding a successful and properly representative exhibition so soon as the middle of October; and many visitors went

to the Grand Palais fully prepared for disappointment.

So far from furnishing justification such pessimism, however, the Quinzième Ex-Position Internationale de l'Automobile, du Cycle et des Sports, was near to being the best of the long series organised by the French equivalent of our Society of Motor Manufacturers and traders — les

Chambres Syndicales des Industries de l'Automobile et du Cycle.

It was thought that, while exhibits might be numerically sufficient to lend a bona fide atmosphere to the 15th Paris Salon, many of those exhibits would not be honest 1920 models, but mere 1914 types—brought up to date, perhaps.

by the addition of standard lighting and starting sets. I should not like to say that this is true of none of the exhibits, but so far as the vast majority were concerned the chassis bore marks of development which, with our ideas and ideals of five years ago, would not have been possible.

How the preparedness of the French industry compares

with that of our own motor trade remains to be seen; we shall be able to judge in a few days, when the doors of Olympia are thrown open. In any case, as a large proportion of the Olympia exhibits will be the same cars and chassis of Continental origin that were shown at the Grand Palais, the success of our cwn exhibition is assured.



IN FRONT OF THE GRAND PALAIS: THE MONUMENT ERECTED IN HONOUR OF THE TANKS.

One of the reasons why one has been doubtful of their readiness for the two shows has been the remarkable reluctance of both British and Continental manufacturers to provide advance details of their new models. This is not yet explained, although presumably—in view of the fact that many new departures are noticeable now that

actual chassis can be inspected—trade rivalry has been the stand upon the ground floor and pick out almost cause.

From the journalistic point of view the paucity of information has been irritating at times, but the fact that the motoring public has been kept more or less in the dark served at least to make the French Salon, and in smaller degree Olympia also, all the more interesting. To the enthusiastic motorist-who exists to-day as much as ever he did, although the class grows steadily smaller in proportion to the ever-increasing numbers of car users—a motor show is something more than a mere opportunity to indulge in an afternoon's sight-seeing. He enjoys inspecting the different makes and speculating upon the respective merits of various methods of construction; and he enjoys estimating the probable trend of future development as a result of his deductions. Possibly he makes a purchase, or decides which shall be his next car; but it is not the commercial side of the question that attracts him primarily.

stand upon the ground floor and pick out almost any stand in any part of the building. Failing this, several ingenious electrical devices were installed. These consisted of boards bearing the names of all the cars exhibited in alphabetical order, and opposite each name a switch button. Thus one found the name required, pressed the button, and, above, on a small plan of the ground floor, a little electric lamp flashed up to indicate the location of the car.

The motor-car exhibits numbered 107 different makes, of which the majority (77) was naturally French. Of the remainder, America topped the bill with 14, Italy followed with 8, Great Britain with 5, Belgium with 2 and Spain with 1. Needless to say, there were no German cars. Apart from this, there was no ground to criticise the international nature of the show, although one felt that an improvement would have been afforded by a greater proportion of British exhibits. Austin, Daimler, Sunbeam, Sizaire-Berwick, and Wolseley, however, were



A NEW FRENCH CAR (CENTRE) AND TWO 1920 MODELS WITH LEFT-HAND STEERING.

From this point of view the Paris show was undoubtedly successful, and surprisingly so, since no one really anticipated that it would have any particularly striking features. One came to the conclusion after a few hours spent in critically examining the exhibits, however, that automobile design is apparently as far as ever from that point of standardisation, or stagnation, which has been reached by the bicycle, for instance. This being so, and cars being as efficient and generally desirable as they are to-day, one rather hesitates to speculate upon the wonders of the car of a few years hence, when it shall have reached that point.

So far as the show itself is concerned, now, as in the past, it will not be fair to compare it with Olympia, on account of the splendid facilities offered by the Grand Palais for such a purpose, and by the unfortunate limitations of our own show building. A uniform scheme of decoration was adopted, as usual, and while neither this nor the lighting scheme was unduly elaborate, it was something better still—effective. It was possible at the Grand Palais to

left to maintain British prestige alone. It is satisfactory to note that we were much better represented in the accessory and tyre sections.

At this late date in the history of the automobile one scarcely expects to carry away any definite impression as to the trend of design in regard to departures from previously normal practice. Yet at the Paris Salon there were several most distinct signs of development and of gradually changing ideas. First and foremost, perhaps, one noticed that the cleanliness of design for which French and Italian cars always have been noteworthy has been carried to a startling point in some cases, and in all it is more than ever a praiseworthy leature. Unit construction of engine and gearbox, probably with monobloc cylinder castings, is universal, and one particular point that struck me was that in very few cases had the electrical equipment that familiar appearance of having been stuck on in any convenient vacant space as an after-thought. Generally the flywheel, and consequently the gear ring, and startingmotor driving-pinion, are invisible, which to my idea does

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REPAREDNESS, efficient organisation, and the willing help of motorists saved the situation during Great Britain's recent " black week."

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limousines, commercial vehicles, touring cars, motor cycle combinations, even solo machines, co-operated

in this great work and enabled the country to carry on during a situation which it was anticipated would drive the community to starvation within a week.

The Automobile Association played a prominent part in the struggle, and its plans, which had been prepared some months previously at the request of the Home Office and Ministry of Food, were faithfully

Carried out by many thousands of willing members. The motorist was the man of the moment—he was called upon to perform a huge, an unprecedented, task, and he "delivered the goods."

So much for the story, now for the moral.

The individual motorist, as well as the State, must be ready for emergencies, and in order to be fully prepared he must not rely on fighting a lone hand but call to his aid the efficient organisation and willing assistance of the Automobile Association,

which for more than fifteen years has led the way in providing road service for motorists.

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tary, The Automobile Association, 33 Fanum House, Whitcomb Street, London, W.C.2.

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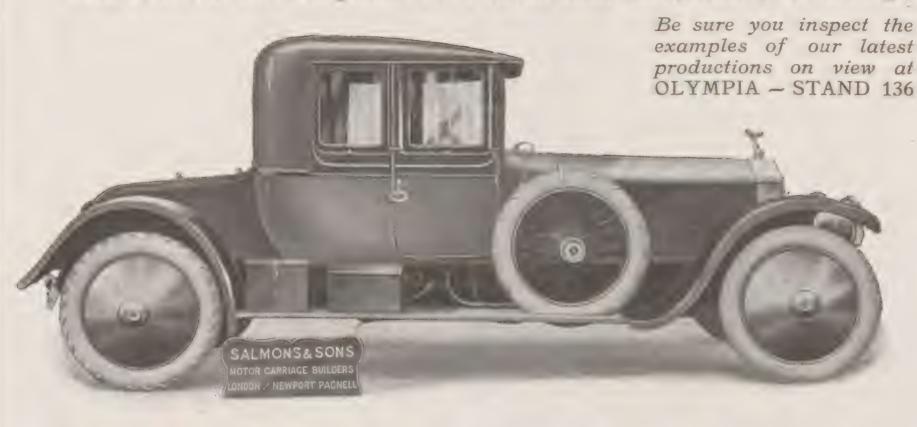
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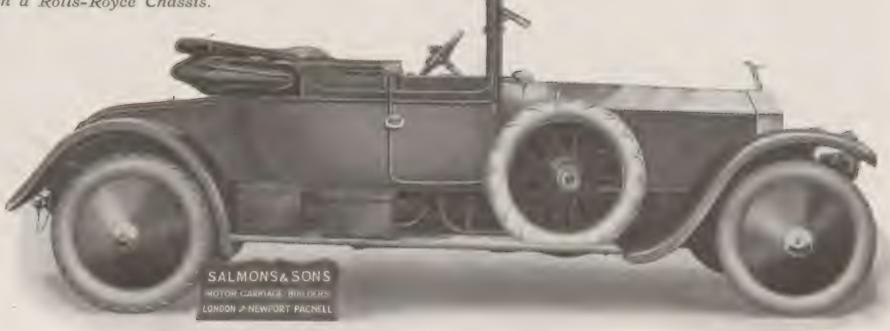


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These illustrations are from actual photographs of a Salmons' Coupé on a Rolls-Royce Chassis.





TACKET AT BUILDING BY

Gnôme et Rhône chassis, on which the fan and dynamo were combined.

Cleanliness of the engine itself was a general leature, and in the case of the Elizalde, a new Spanish car from Barcelona—the first home of the famous Hispano-Suiza—all that could be seen of the motor was a rectangular box of polished steel, with no extraneous fittings whatever, except the carburetter and magneto. Much the same remark applies to the engines of the Hotchkiss, Lorraine-Diétrich, Cottin-Desgouttes, La Buire, Lancia, F.I.A.T., and many another. For absolute completeness in respect of cleanliness. I do not think that any

particularly happy disposal of this accessory on the six-cylinder 40 h.p.

Desgouttes, La Buire, Lancia, F.I.A.T., and many another. For absolute completeness in respect of cleanliness, I do not think that any other car at the Salon quite equalled the S.P.A. in which to all appearance the whole of the power and transmission mechanism was not only enclosed, but carried out the unit construction idea from starting handle (or the place, at least, where it used to be) to the rear wheel hubs

Another most noticeable "tendency" throughout the Salon was toward the adoption of central gear and brake control. Apart from the mechanical advantage of having the gear lever directly over its work, and the comparative ease with which the same type of chassis can be adapted for either left or right-hand steering, I imagine that it is more or less a matter of opinion, and of use, whether the old-fashioned right-hand levers or the new central control be preferred, but apparently the motor manufacturers of

** ** ** ** ** ** ** ** ** ** ** ** **

France look upon the idea as worthy of consideration and, in some cases, of adoption. Mathis, Bayard, Farman, Darracq, and a number of other wellknown cars are in the centrally controlled category.

Those of us who recall the controversies which used to rage as to the respective



THE INSTRUMENT BOARD OF THE 20-H.P. DARRACO.

advantages of four- and six-cylinder engines would have found some amusement at Paris in noticing the numerous instances in which a much greater multiplicity of cylinders has been adopted. Whereas in those days, even if we admitted the superiority of the "six," we did not consider the idea at all in connection with an engine of less than 25 h.p. or 30 h.p., now a six-cylinder 12 h.p. car, such as

the Rolland-Pilain (66 mm. by 115 mm.) or even an eight-cylinder 10 h.p. model, such as the Suère, is nothing out of the way. Delaunay-Bellevilles were among the first to set the fashion in moderate-powered sixcylinder cars, and they are well to the fore to-day, of course. But the modern note was struck at Paris by the twelve-cylindered De Diétrich and Lancia models, while eightcylinder engines, including Darracq, Bellanger, and Piccard-Pictet, were numerous. believe that the V-type of cylinder setting for eight cylinders may be regarded as almost universal, and so far as my observations went, the 75 mm. by 136 mm. Dewald was the only chassis at the Grand Palais in which the eight cylinders were set in line. Incidentally, I might have used this car as an example of clean design, for with its magneto, pump and gear-driven fan all grouped together in front, two carburetters bolted direct to the cylinder casting, and more especially owing to the

extension of the crankcase casting to form a platform level with the top of the chassis frame, it has a particularly non-complicated appearance.

It embodies, too, two points which are among the noteworthy features of quite a number of cars—the platform idea, which does away at once with both the necessity for an underscreen, and with the possibility of dropping nuts and tools into the dirty oil which is almost bound to collect where an underscreen is used, and the use of two carburetters on even small six- and eight-cylinder motors.

While the majority of engines at the Salon were of more or less orthodox type, if small six- and eight-cylindered models are allowed under that heading, it was distinctly noticeable that what is generically but erroneously known as moleurs sans soupapes, or valveless engines, are on the

increase in France—wherein lies a point of difference from the tendency of our own industry. The term "valveless" is usually used to indicate an engine having sleeve, rotary or other type of valves, as distinct from the normal poppet valve; and in that class are such cars as the Piccard-Pictet, Minerva, Itala, Voisin, and Peugeot. But there is, at least, one new French car which has gone farther still, and has a two-stroke engine. Apart from the novelty of its construction, I am afraid it will not find many British purchasers. It is known as the A.S.S., and unfortunately, those three capital letters are inscribed across the radiator without even the saving grace of full stops. Recalling the matter of the onetime Dorsetshire registration letters, I do not think this vehicle has much prospect of success in Great Britain. The car, however, is reported to have made a long non-stop run from the factory to Paris without

trouble recently, and is regarded as a practical proposition in France, where, presumably, the combination of letters has not the same significance.

I was prepared to find at the Salon a distinct tendency in favour of front-wheel braking, but beyond the Hispano-Suiza—which, incidentally, was one of the ever-crowded centres of interest — the Bellanger eight - cylinder,

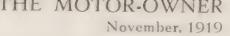
Elizalde and Delage were the only cars I noticed which had adopted it. The Bellanger chassis has three independent braking systems, operated by separate pedals on front wheels and behind the gear-box, and by side lever on rear wheels.

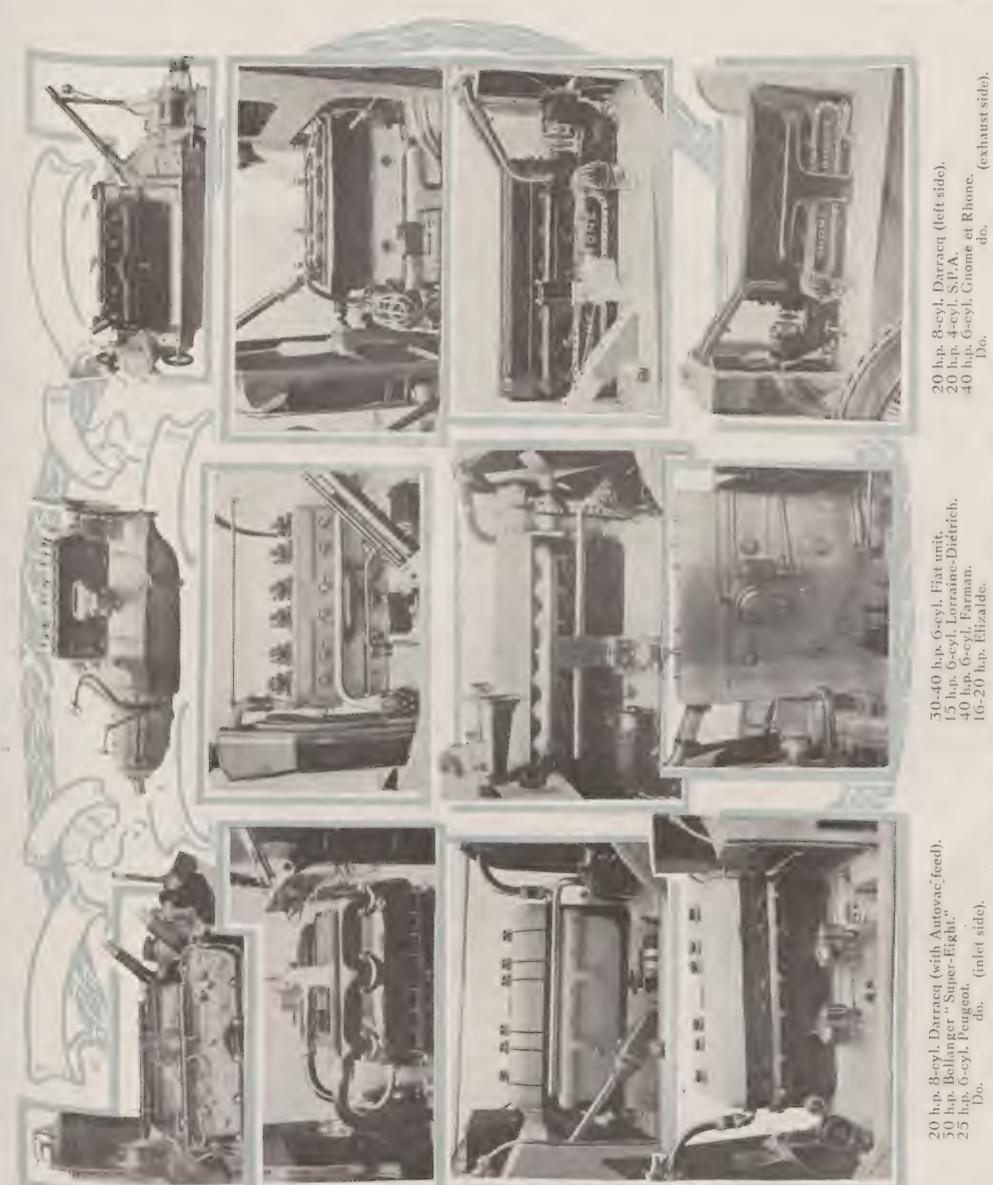
The same 50 h.p. chassis throughout is a satisfying



THE BELLANGER "SUPER-EIGHT" SINGLE UNIT MOUNTING.

piece of work. It is a big, powerful vehicle, of course, but the general impression gained is that it should be easy to maintain in running order. The two blocks of four cylinders are set at the usual angle to each other, with the exhaust leads running rearwards to two separate silencers. The exhaust pipes are directly subject to the influence of





SOME EXAMPLES OF CLEAN ENGINE DESIGN AT THE SALON DE L'AUTOMOBILE.

November, 1919

the fan, with the idea of clearing away heat and odour without annoyance to the passengers. The inlet pipes bridge the V of the cylinder blocks, with the carburettor high up in the centre, and in as accessible a position as it would be possible to find. There is no separate magneto, the dynamo supplying current for ignition. Electric lighting and starting is embodied, of course, and a further refinement is a gear-driven tyre pump. The price of the chassis in France, with five 895 mm. by 135 mm. wheels

and tyres is 50,000 francs, or about £1,600 at the present

rate of exchange.

It is perhaps not remarkable that the pioneers of aviation should drift into motor-car construction, but when one recalls the services rendered to the new sport, means of locomotion; or whatever one may term it, by such men as Farman and Voisin, special interest attaches to the cars which make their appearance under those names. Voisin, an 18 h.p. four-cylinder, 95 mm. bore and 140 mm. stroke model, is, as has been said already, of a "valveless" type, but the Farman—which may be expected at Olympia -is of orthodox character.

It has a six-cylinder, 40 h.p. engine with overhead camshaft, has central gear and brake control, and is built throughout on most robust lines.

A feature in connection with it which was common, in varying degree, to every car at the Grand Palais is the comparatively enormous number of gauges and indicators of one kind and another on the instrument board. Farman has nine indicators, a switch-board and two additional levers, the purpose of which I cannot recall at the moment. In early days our dashboards were encumbered with a like variety of gauges, oilers and one thing and another, arranged in haphazard fashion. We became tired of that, and went in for the simple dash, carrying at most a lubrication tell-tale and a switch; and now, here we are, back again! Personally, I think the instrument board idea is in serious danger of being carried too far. The driving of a motor-car is so simple a thing, and the attention required while actually on the road so small, that there is really no excuse for the elaborate arrangements that I saw Complication of the engine is reduced to a minimum; why not carry the same admirable principle into effect in regard to the dash?

This reminds me of another effort towards simplification of appearance which I noticed, and that is the disposal of the side lamps. In many cases these were mounted on the same bracket as, and immediately below, the head lamps; in one or two cases they were embodied in the lower part of the windscreen framework, while other cars were fitted with combined head and side lamps of neat design, known.

I believe, as the Phare Eclair.

There is the same tendency in the French industry, apparently, as there is in our own to popularise the small light car of about 10 h.p., but my observation leads me to believe that there will be proportionately far more British cars than French of this class. The Mathis is a notable little car of this type; the manufacturers, ap-

parently, have set out to reduce the over-all dimensions of the engine as near to vanishing point as possible, for it is about the smallest four-cylinder block that I have ever seen on a car. The Majola, in two models—6-12 h.p. and 10-20 h.p.—the Bugatti, complete with the latest thing in totally enclosed bodies, although little larger than a Baby Peugeot, and, of course, the Secqueville-Hoyau—the latter with Houdaille shock absorbers at the rear, if you please! are other leading lights in the same class.

THE RESIDENCE OF STREET



THE FRONT-WHEEL BRAKE AND DOUBLE-FRONT SPRING OF THE "SUPER-EIGHT" BELLANGER.

I suppose that always there will be a few freaks at a motor show, and the Grand Palais was not singular in this respect, although freakishness was limited almost entirely to the cycle-car exhibits. About the weirdest arrangement of all from the point of view of appearance, was the Janemian cycle-car. This had a two-cylinder, watercooled 8 h.p. motor, with 75 mm. by 124 mm. cylinders set at 90 degrees, three-speed and reverse gear-box, Ferodocovered plate clutch, cantilever suspension fore and aft, and the fashionable unit construction. Its singularity lav in the position of the driver in the extreme front and in its queer coracle body, the

general impression conveyed being that the steering wheel had been accidentally mounted the wrong way, making the car travel back to front.

On totally different lines, but equally remarkable, was the Rhone-et-Seine cycle-car. This was arranged on a somewhat similar principle to the Phanomobile of older days, the two-cylinder, air-cooled engine being carried on the steering column and driving downwards through a chain to the front wheel—only in this case two front wheels, of very narrow track, with the chain sprocket on the axle between them, were used.

An altogether better idea seemed to be embodied in the Sky cycle-car, in which, while the main frame was of laminated wood—seemingly none too strong, however—the single-cylinder, air-cooled engine and transmission gear were carried rigidly on an underframe of steel. One further example—the Ajam—and I have finished with the small fry. This little car, with quite orthodox engine and transmission gear, had a latticed tubular body, built up with high sides, so that one imagines that the bodywork need be no more than waterproofed canvas stretched over the framework; and, of course, something in the shape of a seat inside.

Having considered a few of the more interesting among the many cars which were shown at Paris, but which will not be present at Olympia, it may be profitable for us to turn to some of the more prominent Continental makes which we shall have an opportunity of inspecting next week.

Of these, undoubtedly the car which aroused the most interest at the Paris'Salon was the Hispano-Suiza, if one may judge from the never-decreasing crowds that surrounded the stand on which the vehicle was staged from opening until closing time. This was not surprising, for with its overhead valves and camshaft, steel-lined alu-

minium cylinder casting, Delco electrical system eliminating the magneto, front wheel brakes, and other special features, the car was certainly in a class by itself, even among the

Continental giants. From the 15'9 h.p. of the Hispano-Suiza which we used to knew the engine has jumped up to the neighbourhood of a nominal 40, with its six cylinders of bore and stroke 100 mm. by 140 mm. But the most interesting point in connection with the car is that the engine is directly a result of war-time aviation experience. It is a modification of the Hispano-Suiza aero motor of which some 50,000 examples were in use, and from what one hears of performance on the road, ex-Perience has fully justified the conversion. As an in-Stance of the painstaking methods of construction embodied in the car, in which

efficiency and comfort have been regarded as the objective rather than a low price, the case of the crankshaft, carried

on seven bearings, may be taken. In the rough, before operations have been begun on it, the steel weighs nearly 600 lb.; this is reduced to 35 lb. in the finished

article.

It is almost needless to say that unit construction has been employed, since the Hispano-Suiza is the most up to date of cars, but with the enclosed overhead camshaft, enclosed vertical and cross-driving gear for valves, distributors, and pump, the absence of a magneto, and the disposal of the generator low down in front of the engine, it is undoubtedly one of the most neatly-designed of powerful cars. arrangement of the fourwheel braking system, operated by a single pedal, is such that any breakage of a rod will not put both sets of brakes out of action, while there are always the lever-

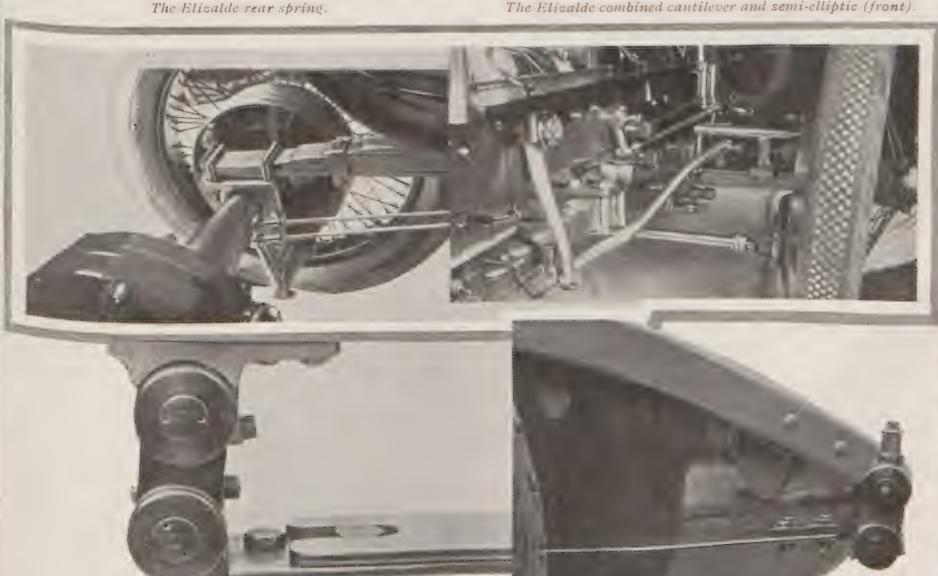
THE SPIRAL BEVEL DRIVE OF THE NEW 40 H.P. 6-CYLINDER FARMAN.

operated rear brakes to fall back upon.

In some ways the 12-cylinder Lancia is an even more

The Elizalde combined cantilever and semi-elliptic (front)





The Lancia rear springing system The Lancia front spring. FOUR EXAMPLES OF SPRING SUSPENSION AT THE PARIS SALON.

remarkable car. To all appearance it has a four, or may be six, cylinder engine, although the array of sparking plugs suggests a mystery, and calls for inquiry. It is found then that the visible part of the engine is simply water-jacketting and covers, which camouflage a 12-cylinder, V-type engine, with the cylinders set at an angle of 22 degrees. The overhead camshaft driving the 24 valves and the exhaust and inlet piping are all within the motor block, so that there is an almost complete absence of external fittings to spoil the symmetry of the engine.

Another interesting feature of the new Lancia is the unconventional rear springing already referred to. A combination of cantilever springs and semi-elliptic—the latter consisting of a single leaf only—has been adopted, and further novelty lies in the method by which the springend is anchored to the axle. Two serious advantages are claimed for the system—first, that the car holds the road remarkably well at high speed, and second, that the suspension is just as comfortable whether a heavy or light load is carried.

The Lancia unit construction, with flywheel covered in and self-starter drive protected, central gear and brake control, and clutch and brake pedals mounted in position, was as complete as that of any car at the Salon.

The new F.I.A.T. cars, while conforming to modern practice in all essentials, have many features of individuality, and it is interesting to note that the whole of the electrical equipment is produced at the Turin factory. Originality is exhibited in the mounting of the lighting dynamo. This is of circular section, and is carried in a circular extension of the timing-gear housing. It is driven by means of the same chain which operates the camshaft, and, owing to eccentric mounting, requires only to be revolved slightly in its casing to take up chain-slackness. A similar method is adopted to secure the starting motor, and although this is carried on the lower half of the base chamber it is readily accessible.

The engine is a 20–25 h.p. six-cylinder single casting and with the clutch and gear-box forms a unit which is secured to the frame by four-point attachment. The carburetter is an entirely new double type, with a single float chamber, two high-speed and two low-speed jets. Petrol is pressure fed by means of an air pump driven off the camshaft, but instead of being fed direct to the carburetter, the fuel first fills a small auxiliary tank on the engine side of the dash, whence it flows by gravity. Thus there should always be a head of petrol available for starting purposes without using a hand pump. The system appears to be a considerable rival of the popular vacuum arrangement.

The Delage car ran the Hispano-Suiza fairly close at the Salon in regard to the interest it aroused. Here was another example of the moderate-powered car grown up—for the new Delage has a six-cylinder, 80 mm. by 150 mm. engine. Two Zenith carburetters bolted direct to the cylinder-casting are employed. The engine, multiple-disc clutch housing and gear-box form the usual neat unit, and although an overhead camshaft has not been adopted the valve operating gear is effectively screened.

Front-wheel braking is one of the points of interest of the car, the brakes on all four wheels, as in the case of the Hispano-Suiza, being applied by a single pedal, while compensation is effected by an actual differential gear, instead of the usual simple but rather haphazard method.

With regard to "carrosserie" I am glad to be able to say that France has nothing to teach us, and we have nothing to learn. There were, of course, some very fine bodies at the Salon, of every type, but so far as the closed bodies—

limousine, interior-drive saloon, coupés and so forth—were concerned, there was, happily, nothing that one might not have seen upon the English roads any day of the week. In the touring car class, the shelved-in coachwork with which we have been getting familiar lately appeared to be popular, and in both three-seaters and larger cars there seems to be a movement towards the elimination of one pair of doors.

A car on the Sunbeam stand was one of the most notable examples of this tendency. The general colour scheme was in 'a particularly restful shade of dark-green; the body had but one door, and access to the rear was gained by means of movable front seats, with a narrow passage-way between.

The same idea in regard to three-seaters, having the third seat by itself at the rear, was seen on many a stand; and even where the improvement of the "dickey" had not reached quite so advanced a stage of development, as in the cases of bodies shown on Sigma and Delage chassis, there was still evidence that the old uncomfortable method of accommodating occasional passengers has passed.

The use of natural wood, varnished but unpainted, was more than usually noticeable, the same Delage car already mentioned having grooved wooden running boards in natural colours and unadorned by rubber or aluminium covering. One of the exhibits on the Bignan-Sport stand was equally notable from this point of view, and with its splayed wings and nickel bonnet of modified Rolls-Royce pattern it certainly justified the second half of its title.

This sporting type of body was further exemplified on an Ariès chassis, in which a pale buff had been utilised for the colour scheme. To all intents and purposes the body was an ordinary four or five-seater; yet little touches here and there had lent a sporting air, while comfort was not unstudied. The American idea of fixing a robe rail was adopted both at the rear and before the front passenger's seat, the rail being covered in leather to match the upholstery. For the convenience of the rear passengers, also, a reproduction of the instrument board in polished mahogany was installed at the rear; this, however, consisted of a cabinet instead of instrument dials, and while it was a by no means essential fitting, certainly added to the appearance of the car.

Taking the Paris Salon all in all, however, one was distinctly gratified to find that there was nothing startling, from the British point of view, exhibited. One might continue to refer at great length to isolated instances of bodywork of outstanding merit, such as those already mentioned; but not one of them was any different in quality, design, comfort or appearance from that which we may anticipate seeing at Olympia in the course of a few days. From the engineering point of view also. although the Salon provided several examples of complete originality in automobile design, and many an instance of improvement in detail such as five years of normal development might be expected to show, still, judging by advance information, the British motor-car industry has derived much the same knowledge and has embodied it in much the same way as the French. Olympia would have been equally full of surprises with the Salon—but the Salon got in first. Perhaps our show is robbed of some of its thunder; but I do not think it matters. With the present high scale of prices ruling, the addition necessitated by the import duty is a practical incentive to "support home industries," and Olympia, by all accounts, will provide us with quite as wide a variety of choice as the Salon provided for Continental motorists.



"WE WERE ON A SPINE OF THE BALKANS."

A WOMAN AND THE BELL.

A Short Story.—By MAX PEMBERTON.

N the notebook of memory we are apt to turn most willingly to the pages of the hills, and we lift our eyes to far horizons rather than debase them to the valleys about us.

As I write this a picture of mountain and of forest is in my mind, and a Hun dominates it. I see the town of Sérajevo, the Austrian going to his death, and away to the northward the woods of the Balkans and the matchless town of Jajee, with her waterfalls and the Travnik.

Somewhere in those heights I met the woman and heard that her "man" was about to die. It was a day of torrid heat, in the year 1912, and even the thunders of a mighty cascade did not suggest the cooling waters of the visions.

Be it said that we had come many miles upon roads which delighted us. The great wheelbase of our "Alpine model" embarrassed us at some of the corners upon the "inspired" passes, but otherwise we were happy. A perfect engine gave a glad tongue to altitudes, and we lunched at an inn, where they plied us with the horror of wolves. It was good, also, to sit for an hour by the mountain torrent to see the trout come out—nor was the spectacle of an ancient Slav, roasting a lamb primitively beneath a hedgerow, unwelcome.

We were upon a spine of the Balkans, and this was country few English had seen—but two remembered them in twenty years, I was told. A simple people had fallen under the lash of the Austrian, and the crack of his whip echoed in the ravines. Cavalry, we were informed, had been marched across this very pass two days before we crossed it that we might see nothing evil. They did not wish us to return to London with our throats cut, nor would they have us chant any hymn which did not laud the unspeakable One.

For our part, we did not care a rap for politics at that time. So easily, as La Rochefoucauld tells us, can we bear the misfortunes of our neighbours that we drove some hundreds of miles amid these divine hills without caring a scudo whose back was lashed or about whose neck the noose was drawn. The tales of horror were merely incidents for a notebook. They put us at Jezéro into a barge with six musicians to cheer us, and told us that every one of the half-dozen was a murderer who would be hanged presently. "But," said they, "first we shall execute the man who led them to their destruction"—and we understood that he was a person of importance, one whom we should now call a Jugo-Slav, a young Count and landowner, whose crime was hatred of the Austrian.

The intimation did not move us to sorrow. We ate not less of the succulent mountain trout nor spared potent wine that had come out of Mostar. What was the young Slav to us or we to him? It seemed a thousand to one that we should have forgotten his very existence when to-morrow's sun shot up above the gloomy mountains. Yet such was not to be. The day was but an hour older when the young Count began to interest us very much.

* * * *

Our way lay downward from the mean inn to the bosom of the Kemy Valley. Encircling us were the great domed mountains, their summits often capped by forest. The torrent raced upon a steep and often showed us cascades. which a guidebook would have called incomparable. In the woods about us the Hungarian captain who was our guide placed bears and wolves abundant. "In the winter," he said, "it would be dangerous even for a regiment to cross this pass, and no detached party would dare to attempt it. But we saw no wolves, and the bears were teaching cubs their catechism upon the far side of the ravine. Presently the road swung sharply to the left, while a plateau of stiff grass thrust itself between us and the river. And here we met the lady, and, seeing her distress, we stopped immediately, to the great annoyance of the Hungarian, who lacked the elements of chivalry.

She was sixteen years of age, this charming Najeska—

for such I learned her name to be—and as far as you may and with that even our Hungarian was not familia admitted, however, that the encounter was curious

Here was a mere child with the airs and graces of a woman of twenty-five. In a way she reminded me of Thomas Hardy's dairymaids, for her hair was like so much flax and her cheeks were chubby; but there was the Orient in her eyes and lips, and the jangle of a harem followed the movements of her sequins. I heard, to my

and with that even our Hungarian was not familiar. He admitted, however, that the encounter was curious, and did not deny that the young Count was the man he had named to us yesterday when we were rowed upon the Lake of Jezéro by the six happy murderers.

"There was a good deal of trouble at Travnik," he said; and we had something like a mutiny in the local regiment. Janowitzá was the officer on duty, and, of course, he is



"HERE WAS A MERE CHILD WITH THE AIRS AND GRACES OF A WOMAN OF TWENTY-FIVE."

astonishment, that she was the absolute owner of much of the woodland through which we had driven that day. Her father had been a Bosnian noble whom undoubtedly the Austrian had done to death. Her lover was the Chevalier Janowitzá, whose head, if no pardon came from Vienna, would be struck from his shoulders at sunrise to-morrow.

To be sure, she could tell us little of all this herself, for she spoke but a few words of any language but her own.

CALL TO A DECIDE OF THE REAL PROPERTY.

responsible. They sent him to Brod to be tried, and he will be executed according to the old military customs of the country. We pay them that compliment," he added with a laugh; "though, of course, if the fellow prefers to be shot, we shall shoot him. The girl, I suppose, was on her way to Brod to see the last of him. She is foolish to go, for they may not permit her to return. In any case, she will hardly be in time if she goes on as she has begun. The place is eighty miles from here and

November, 1919

the road is difficult. If I knew enough of her language to advise her to go back, I would do so. As it is, I suppose she will hardly understand me," and he addressed himself to her in the German of the kindergarten.

She, poor soul, evidently understood him too well. Her hatred of his race was to be observed in every look and gesture. I do not doubt that she was telling herself how such men as he had destroyed her father, and now would destroy her lover and her home. Such distress I have rarely seen written on the face of woman. It was as though some frantic hope of yet saving the Count had come to her, a fierce desire to blot out the miles that intervened, and by a miracle to find herself in his arms and to hear that he would live. All this was to be read without any word at all as Najeska stood by the side of the wrecked carriage, and implored us by her look to have pity on her. There was a very tragedy in the child's attitude.

"They seem to have had a bad spill," I said to the Hungarian captain; "broken the pole, haven't they? And certainly the near-side horse doesn't look good for much. How far did you say the place was from here?"

"A hundred miles, every yard of it, and another pass to cross. Her attempt was ridiculous from the beginning. They have always been a family of mad people, however. She, I am glad to say, is the last of her race."

"She is evidently a girl of some courage," I put it to him. "Suppose that we took her to Brod ourselves. It is nothing to me, nor to you, I understand. Your excellent Government begged me to go where I pleased, to see what I wished to see. Well, I should very much like to see the Count Janowitzá."

He looked at me in great surprise with an expression of much cunning. My visit to Bosnia and Herzegovina had been undertaken, as he knew, at the invitation of the Financial Minister, the famous Baron Kallai, who had wished to have his work written up by supposedly unsophisticated British journalists. Apparently the Baron had been all candour, as Huns were apt to be. Everything was to be shown to me, he said, all my questions to be answered. The great work that Austria had done in her acquired provinces was not to be hidden—far from it, they desired that all the world should know of it. This the Hungarian pilot understood well enough; but such a request as I now made took him utterly by surprise. To see a prisoner condemned to death! "Impossible!" he said.

"If it were only in my power," he pleaded—and added firmly, "but it is not; even the Baron could not admit you to a military prison without the Emperor's consent. We can go to Brod, of course, but you will only see brick walls and the famous belfry when the bells tell of death. That, I am sure, would not amuse you."

"On the contrary," I rejoined, "it would amuse me very much indeed—as much as it would gratify this little lady. To Brod by all means—please tell her so, and invite her to sit here beside me. I am sure you will not mind taking a back seat on this occasion only, and I do not doubt that she knows the way."

He shrugged his shoulders, but had no answer. My

determination was evident, and his instructions were not wide enough to cover so untoward a happening. Stammering and stuttering, he did his best to explain the matter to Najeska. But there was little need to explain. She was up beside me before he had uttered twenty words. A shout of triumph to her coachman, and we were off—God knew whither or to what purpose.

I have driven a car upon many roads, and in circumstances most curious, but never have I embarked upon an itinerary so apparently foolish as this drive to the Bosnian frontier, with a girl whose lover was to lose his life when the sun rose again. Well I knew the futility of that impulse, yet some will stronger than my own drove me on, and an excitement I could not define speedily began to possess me. Of the road itself I remember little—neither of it nor of the majestic mountains which encompassed us as sentinels about a valley of despair. We went by torrent and cascade, through hamlets which had stood when Mahomet came to Bosnia, by towns which were older than the birth of history—yet ever towards the north, to the gate of a prison and to the place of death.

If such was my mood, that of Najeska herself was not less one of concentration upon a purpose.

Dressed in a tangle of silk muslin and plaques of pure gold, she would have cut a fine figure at a dancing club and made no unfamiliar picture upon any operatic stage where brigands lurked. A heavy cape of "Russian lamb" hung from shoulders that were amazingly white, and a sledging cap of the same skin sat well upon her flaxen curls. But her appearance, or what we thought of her, of the strange fact that she rode with strangers upon a mission so intimate, affected her not at all. She was ever seeking a far horizon beyond which there would be light and hope. Her eyes saw nothing but the road before her. She delighted in the speed of the great car, and ejaculated audibly as it made light of those gradients which Hun engineers had contrived. Day or night, I perceived, would mean little to her. The sun set, and she made no movement other than to draw the cape closer about her shoulders. Her annoyance was emphatic when the Hungarian at length shouted to me to halt, and I discovered that we were in a village of the plain, and that we had come to rest at the very door of a post-house.

"What is it?" I asked him.

"Surely," he protested, "you are going to dine!"

"If we have time. You must ask the lady."

I turned to her and perceived that all the colour had left her face suddenly. A dread of delay was written in her eyes. The man would die, and she be absent from him. Yet, were she upon the scene, what hope was there even of a word exchanged between them? I knew the Austrian too well for that. Surely we drove upon an errand so quixotic that the very Fates must be deriding us.

You see," I said to the Captain, "Najeska does not want to dine."

"And you yourself?" he asked me, incredulous.

"Oh," said I, "we shall dine to-morrow anyway. Get a bottle of wine and some bread, if you can. A picnic will be a change. Have not I told you that you have been overfeeding me?"

He made another gesture of contempt, and with his man, Oscar, he disappeared into the post-house. When he came back he was alone; but he had sandwiches in a parcel, and a couple of bottles of the detestable wine of Mostar under his arm. We drank a draught there and then, Najeska just putting the cup to her lips. But the food she would not touch, nor would I press it upon her.

It was full dark when we left the place, though we had a glorious southern moon later on. I remember that we drove through the night upon a good military road that

was to be much heard of when Armageddon came. There were but three of us in the car now, the chauffeur having remained in the village; and it occurred to me that possibly he might have been there in the hope of delaying passage. If this were the intention, it did not succeed. By sunrise we had passed the frontier town of Brod, and it was not yet four o'clock when we reached the citadel upon the bank of the Danube in which the young was to die at six.

received that I did not pursue it. The man was a political offender—that was the end of it, and it remained but to listen for the passing bell which should speak of his death.

It was nothing to nie, you say; yet, believe me, that Najeska had made it much. Never shall I forget that silent wood with the broad river beyond, the gloomy citadel and the figure of the kneeling woman who prayed. There were moments when the very delay seemed intolerable, and I could have cried aloud for the bell to ring—other moments when a wild hope, I knew not of what, animated me. Would it never end—had there ever been an hour so long in the story of time? Watch in hand, I



Count Janowitzá "VERILY DO I BELIEVE THAT THE CHILD WAS MORE THAN AN HOUR UPON HER KNEES."

Here we had our second consultation. I asked the Hungarian frankly if he could not take Najeska within the prison, and was somewhat astonished at the curtness of his refusal.

"It is quite impossible," he said bluntly; "I have no authority, and we may get into trouble as it is. This is the best we can do. The bell will ring when the man is dead. If it is any consolation to her, the girl may wait here until she hears it."

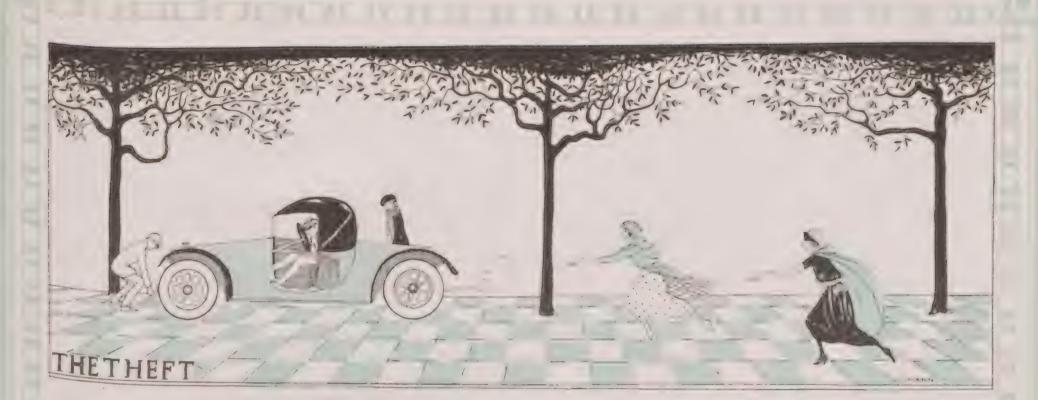
I tried to tell Najeska as much, but I think she understood. A scene more painful is not within my experience. Verily do I believe that the child was more than an hour upon her knees, there by the roadside, while the Captain and myself, for pity's sake, left her alone and went to walk in a little wood that bordered the river. What we talked about God only knows. My own attempt to raise the question of the Count's innocence or guilt was so coldly

waited for the instant of doom. It was six o'clock, I said—why, then, was the bell silent?

The Hungarian answered that question over an excellent dinner in the hotel at Ilidze that night.

"I sent a telegram from the post-house," he said, "and they knew that Najeska was with us. The reprieve was a compliment to you. You will be able to tell them in England how we temper justice with mercy. The Count is free. Surely he will have the decency to ask you to his wedding."

I cared nothing for that, though oddly enough, the invitation reached me many months after I had returned to England. A lagging post—or possibly a bureaucrat at the helm? Anyway, nothing mattered while Najeska had her happiness—and as for the date of her wedding, it is impossible to persuade me that she lost any time.



THE CAR OF DREAMS.-By BOADICEA.

OME people dream of castles in Spain, some of wealth or gratified ambition, or even of fair women, but the dream that most frequently haunts the woman motorist's pillow concerns the ideal car, and for the present it is more or less of an idle one.

Sometimes, of course, dreams come true, and while it is unlikely that Olympia will prove to be the Land of Fulfilled Desire in the matter of cars, the woman motorist's thoughts dwell on what she would like to find there rather

than on what she expects actually to see. For the woman driver has very distinct ideas of what she wants in a car, and she does not see why her ideas should not meet with consideration.

ECONOMY.

Comfort and economy are the two principal characteristics of the dream car. Economy means, to begin with, as low an initial cost as is compatible with good materials and sound structure. So far as one can see, the good, cheap car of British manufacture need not be expected for some time to come; in fact, it shows no present signs of dawning on the horizon.

Still, that is no reason why it should be despaired of; given healthy competition and a fair field and no favour, it is bound to come sooner or later—the sooner the better "Accessibility is another important factor in motoring comfort." future inventors will evolve a from the motorist's point of

view. But economy is not only a question of price: it includes such things as a high mileage to the gallon and the saving to the driver of time and trouble. A car,

however cheaply priced, is no economy if it proves expensive or troublesome to run.

INTERCHANGEABLE PARTS.

Standardisation of parts, such as obtains so largely on the other side of the Atlantic, means an enormous saving of time and effort, not only in small running repairs, but in cases of serious damage. There is no reason why a car should remain out of commission for days, or even weeks. simply for lack of an adequate supply of spare parts.

There is also no reason why any car should harbour a collection of elaborately assorted nuts when two standard sizes would amply ensure that variety which in running repairs is anything but a spice to the driver's life, though it may be a stimulus to her temper. Such simple aids to happiness as interchangeable nuts and sparking plugs are amongst the improvements demanded by the woman driver.



STANDARDISATION.

The woman driver looks forward to the standardisation of driving systems. It is absurd that such an anomaly should exist as even the single instance of the De Dion decelerator, but where standardisation is most desirable is in the gear-change. It is to be hoped that in the near satisfactory automatic gear-

The invention of an automatic universal gear change. and clutch combined would come as a boon and a blessing to the novice in the art of driving, and even the most experienced chauffeuse would welcome such a simplification of her task. Failing the automatic gear-change, driving would be enormously facilitated and mishaps avoided by the adoption by all car makers of one system of gear change.

As things are at present, confusion is the lot of the woman who drives cars of varying makes. What is the reverse in one system of gate change may be the top speed in another, and to go straight from an accustomed change from low speed to high to one devised on the opposite principle is a nerve-racking experience that may end in



"No woman really enjoys cranking up

disaster. Not every driver possesses the presence of mind and the responsive quickness of hand required for such a radical change.

There is a good deal to be said for the left-handed gear-change seen in many American and now several European cars. While it does restrict the seating capacity, and although at first sight it may appear disconcerting to the driver accustomed to use her right

hand, the slight awkwardness is soon overcome, and the advantages are obvious; the distinct mechanical gain of direct connection between the gear-box and the lever, and the more equal division of labour between the right hand and the left. Drivers who have used the left-handed gear-change for any length of time rarely retain their prejudice in favour of the right-handed system.

HELPS IN TIME OF TROUBLE.

The engine-starter is a device without which no car can call itself ideal.

No woman really enjoys cranking up a car, no matter how easy it may be to start, and there must always be occasions when male help is not available. Even when it is, any woman driver who is worth her salt prefers to be able to rely on her own unaided efforts. It is difficult to see why, in this day of mechanical grace, the engine-starter should be classed as an extra, and not find its place, as a foregone conclusion, on every car offered for sale.

Accessibility is another important factor in motoring comfort. Much misplaced ingenuity seems to be exercised in rendering such essential parts as the carburetter immune from interference. In the ideal car of the future every vital part of the engine ignition and lubricating system will be easy of access, and one will no longer see the hopeless woman motorist constrained to grovel under her car or take

down her engine in order to effect what should be a simple adjustment. Inaccessibility means not only an insane waste of time and labour, but very often the ruin of both clothes and temper. To emerge from such an ordeal covered with grease and grime is not the most exhilarating experience in the world, nor is inaccessibility a necessary evil.

Again, the changing of tyres is a labour of Hercules from which the woman driver shrinks. The car on which her future hopes are centred will boast tyres almost as readily changeable as a pair of gloves. Rims that can be expanded or contracted by the turn of a screw may solve the problem, but that is a matter for the genius of the inventor. The demand is plain, it is for the maker to produce results. The dream car will also possess some simple and easily adjustable device by means of which a standing car can be safeguarded against theft—a device simple and more effective than anything now in existence. Something in the nature of a steel combination lock might meet the difficulty, but that again is a question for the expert.

PERSONAL COMFORT.

The woman driver expects her ideal car, besides these conveniences, to be built with a view to her personal comfort. All women are not planned on the same lines, and it is just as absurd to oblige a short woman to strain every nerve to reach clutch, foot-brake, and accelerator, as to require a woman endowed with unusual length of limb



"The changing of tyres is a labour of Hercules from which the woman driver shrinks."

to sit in an uncomfortably cramped position with her knees jammed against the steering-wheel. And so every car of the future will have an adjustable driver's seat. Such details as luggage accommodation, fittings and accessories will, of course, be adapted to the taste and requirements of the individual purchaser.

All this implies that the makers of the ideal car, instead of pursuing the mistaken policy of expecting the purchaser to content him or herself with whatever sort of vehicle it pleases them to produce, will ascertain what the public really wants, and design their product in accordance. That is the only way for the dream to come true.

NOTES ON ELECTRICAL EQUIPMENT.

HERE must be a powerful strain of pure "cussedness" in the automobile engineer, for, tell him that a certain thing is impossible, and, the better your reasons for telling him so, the harder will he strive to achieve that impossibility. What is still more to the point, he usually succeeds.

It is the best part of thirty years now since gas engine experts had "the best of reasons" for assuring us that the



C.A.V. POLE PIECES AND ARMATURE IN THE MAKING.

required for the power plant. It has been proved in the intervening years that, if a gas engine needs to be bedded down in a foot or so of concrete, the petrol engine is able to function noticeably well without, properly speaking, a bed at all.

The motor engineer has gone further, indeed, and the automobile chassis of the year of grace 1920 contains not only a remarkably efficient power plant, but a complete, if miniature, electric power station as well.

As a matter of fact, the motor-car is fast becoming what many a man who keenly feels the enjoyment engendered by his complete mastery over the machine may consider over-developed. So much is done automatically, and so little is left for individual skill to compass that motoring to-day bears little resemblance to the pastime known by the same name a very few years ago. Still, it ill-becomes us to decry progress, and as the majority of people will look upon the car as a means to an end, and not upon the driving of the car as an end in itself, the comparative perfection of the modern vehicle must be regarded as

something that is all to the good. But one reserves the right to experience a hankering at times for some trouble to conquer, for one more opportunity of establishing the superiority of mind over matter.

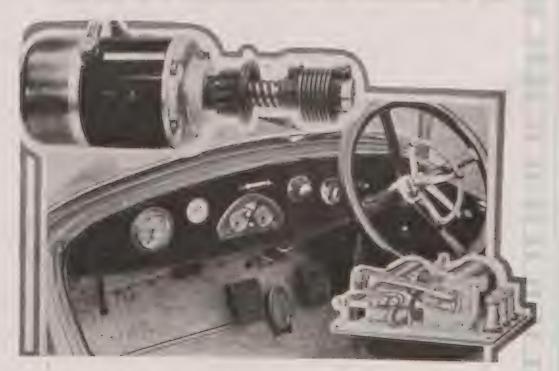
In any case, there is no doubt that the adoption of complete electric equipment by all the makers of well-known cars marks an epoch in automobilism as great in its way as, say, that which was heralded by the introduction of the first detachable rim or wheel. But in comparing these two innovations, let it not be thought that they are in the same category as trouble-savers. The detachable rim is a trouble-saver pure and simple; it has no other purpose than to save trouble.

The greatest trouble, on the face of it, that the engine starter can save is the cranking of a refractory engine—and this is just the one purpose above all others for which it must not be used. There is, one realises, great temptation to run the motor as long as the battery has any current left in it, in the hope that, more or less by accident, the engine at last may catch the spark, regardless of inevitable and irremediable damage to the battery.

No: if an engine refuses to start after having been turned over a reasonable number of times, either by hand or by the motor, there is obviously something the matter, and it would be ridiculous to exhaust either oneself or the accumulators by prolonged cranking without seeking for and removing the cause of the trouble.

This point is insisted upon for the reason that many thousands of these highly efficient little motors are finding their way into the hands of people who know no more of electricity than is learnt from switching on the light in one's home or office, and improper use of the electric starter not only will cause damage and dissatisfaction in individual cases, but conceivably might injure the reputation of what is, after all, a wonderfully useful and satisfactory accessory.

We have got very much into the habit of reading the instructions on a packet of photographic plates, a bottle of medicine, or what not, forgetting them, and then proceeding on guess-work. Little harm, if little good, results as a rule, but be it remembered that the instructions of the



THE ROTAX STARTER, SWITCHBOARD AND CUT-OUT.

makers of electric lighting and starting sets must be followed in their entirety.

Beyond this one most important point both types of apparatus are usually as nearly "fool-proof" as is

necessary, and when the novelty of being able to start the engine or light any given lamp by pressing the appropriate button has worn off, the presence of dynamo, motor and battery may be conveniently forgotton for long periods without hurt. A drop of oil in the lubricators, or a

few drops of distilled water in the accumulators is attention sufficient to last for many miles of service.

There is something attractive about the use of the single unit system. in which one machine may be used either as a generator driven by the engine to supply current to the battery, or as a . motor driving the engine for starting purposes, but although the leading electrical accessory houses, such as Rotax, Lucas, Smith, Vandervell, and Brolt, are making or intend to make sets of this type for use with the small engines of the popular II'9-h.p. class, a separate dynamo and motor have been adopted generally on medium and large cars. fancies, however, that this tendency merely indicates that electrical equipment is still in process of improvement, and that it is probable, as absolute perfection is more nearly approached, that the tide will turn in favour of a single unit for all sizes of engine. This, however, remains to be seen, and anyway, except in the matter of price, the advantages of the single unit system are rather abstract than practical.

A point that occurs to one in connection with the electrical equipment is that the for many years unassailably foremost position of the high-tension magneto as a means of gas ignition is no longer safe. At the moment it is the usual practice to equip

a car with a magneto in addition to the dynamo and motor, but from the ordinary, not-too-technical motorist's point of view it seems that, so long as one has a current of the requisite force and volume to secure ignition it

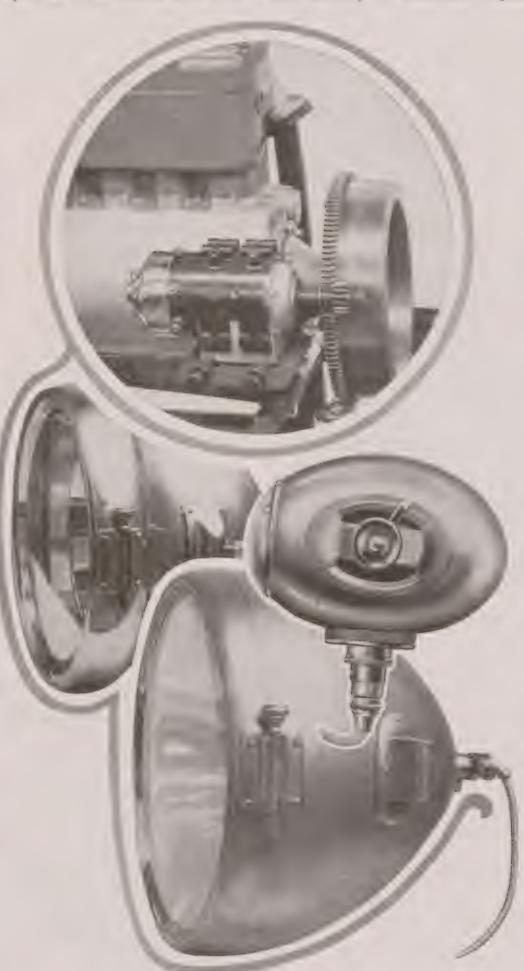
matters little whence it comes. If it can be obtained from the lighting dynamo without fitting an additional generator in the shape of a magneto, so much the better—it is, after all, merely a question of choosing a generator and battery of sufficient capacity to supply all the de-

mands for current which are made by the up-to-date car-owner.

Incidentally, there are still numerous motorists who—though they have used magneto ignition perforce-retain a preference for the old type of accumulator, coil and distributor. The magneto had the one great advantage of requiring practically no attention, but now that accumulator-charging is carried on automatically in the course of a run, the magneto has, so to speak, not a leg left to stand on.

Curiously enough, one of the first cars to come forward boldly with a standard electrical equipment—the Cadillac—embodied all these points which we are now considering as possible future developments some eight years ago, but although we have followed that lead to a large extent, we still appear to suffer from a certain amount of dubietv.

In the main, as one would naturally expect -since neither the dynamo nor the motor is a novelty in itself the apparatus of the leading makers is very similar both in general design and method of application. The lighting set necessarily consists of the generator and battery, of voltage ranging from 6 to 12; the switch board, fuses, an automatic cut-out, a chassis distributing box, and, of course, the necessary lamps and such other fittings as may be desired. These components are common to



THE C.A.V. ENGINE-STARTER AND THREE TYPES OF LAMPS.

all lighting sets and vary little except in pattern.

This remark is equally true as applied to the switchboard, but this is the only part of the system in which really striking divergencies from a common type are

November, 1919

noticeable. Some of the neatest patterns—and surely neatness is the principal point at which to aim after efficiency has been secured—are unfortunately to be found on American cars. Praise, however, should be given where praise is due, and the Smith switch-board certainly deserves



THE BROLT DYNAMO WITH FAN-COOLED COMMUTATOR.

the best that can be said of it. This switch consists simply of an ampèremeter dial and pointer of the same size and pattern as the Smith clock, - 11 1. 1. 11 ometer and other accessories, and "on," ''off,'' "charging," and the various combina-

tions of lights are obtained merely by turning the knurled bezel. There are no buttons or levers, and it can be imagined that an instrument fitted with this switch and the other corresponding flush-fitting instruments is a particularly neat affair. The new Rotax switch-board is also admirable, but as it consists of a volt as well as an ampère meter, and a separate switch lever, it is slightly less compact than the Smith. The Brolt and C.A.V.



THE BROLT ENGINE-STARTER.

switches aim more at ornamentality than compactness, and certainly they achieve that end.

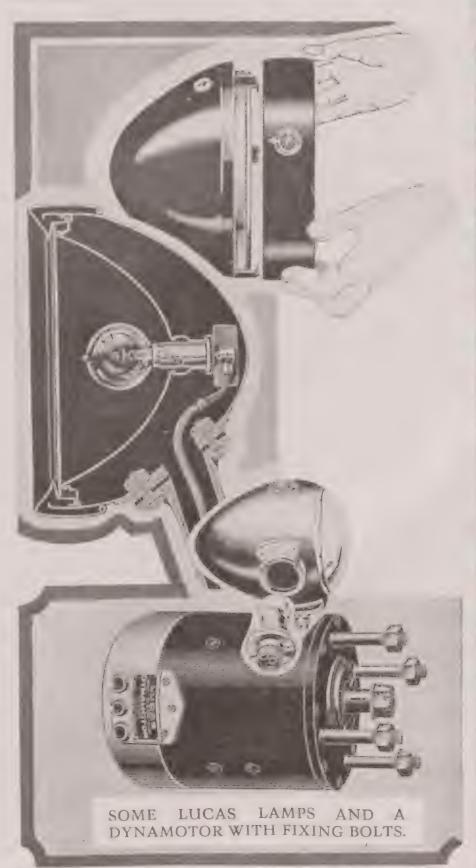
The self-starting set is much more simple. A single battery, of special construction to withstand the heavy discharge caused by operation of the starting motor, serves for both lighting and starting; the remaining parts of importance are the motor,

which usually drives the engine through a gear ring on the flywheel, with which a small pinion on the armature shaft engages, and the switch. In the latter there is certainly a good deal of variation in the different machines on the market, and the same is true of the various methods by which automatic disengagement of the motor pinion from the flywheel gear is secured when the engine has started.

When one considers the effort required to turn over a medium-sized engine—reduced, admittedly by low gearing, but still great in proportion to the dimensions of the motor—one cannot but wonder at the general practicability of the modern self-starter. Apart from the actual power required

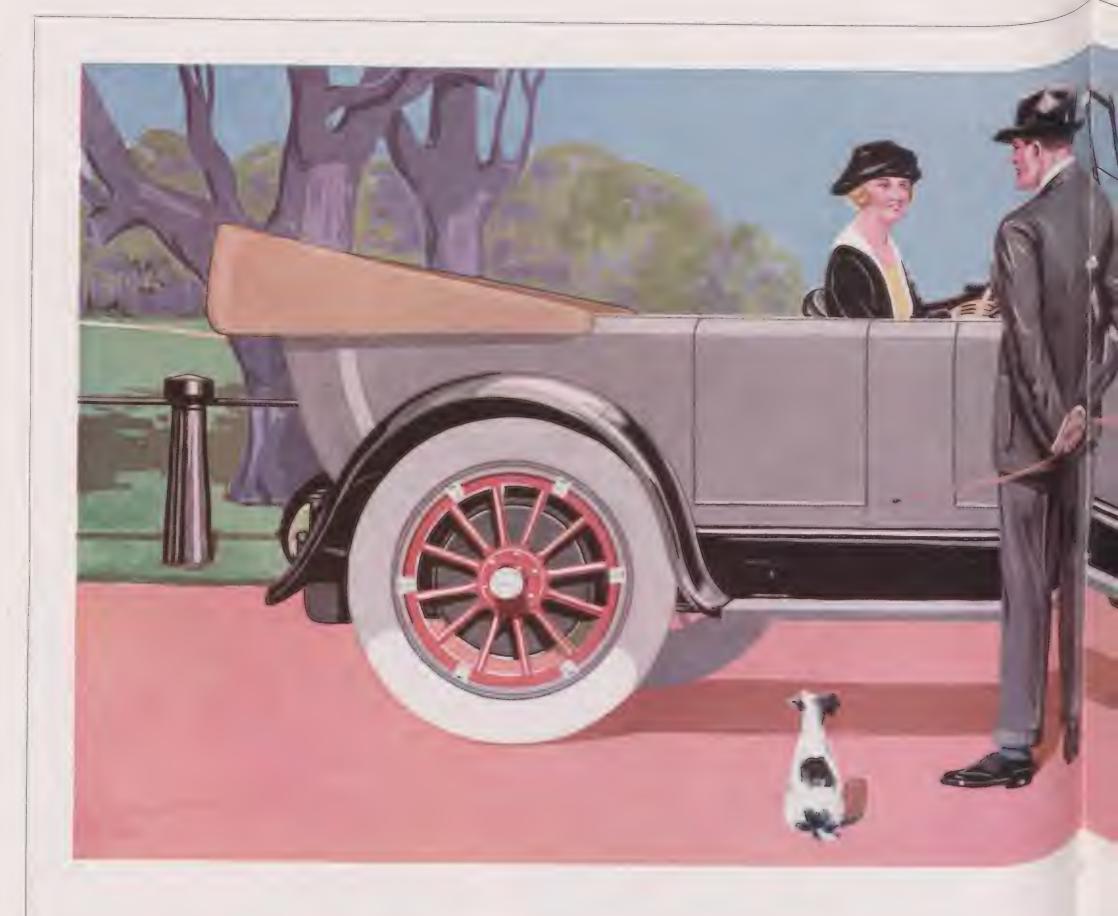
to perform the operation, imagine the strain on the bearings of the armature, to the shaft of which the starting pinion is directly keyed! Some effort has been made to remove this strain from those particular bearings in the case of the latest. Brolt starting motor, in which an additional support on the outside of the pinion is provided for the shaft—to the lay mind, a highly necessary provision.

Otherwise there is an apparent agreement as to the best means to accomplish the functoins of both machines which must be pleasing to the car owner in that it indicates arrival at an advanced stage of development, and promises satisfactory service. One is forced to the conclusion, however, that nothing in the shape of finality has been reached in regard to electrical equipment, and it is more than probable that by the time we have an opportunity of critically observing the different devices at Olympia again much interesting, and, maybe, startling, progress will have been made.

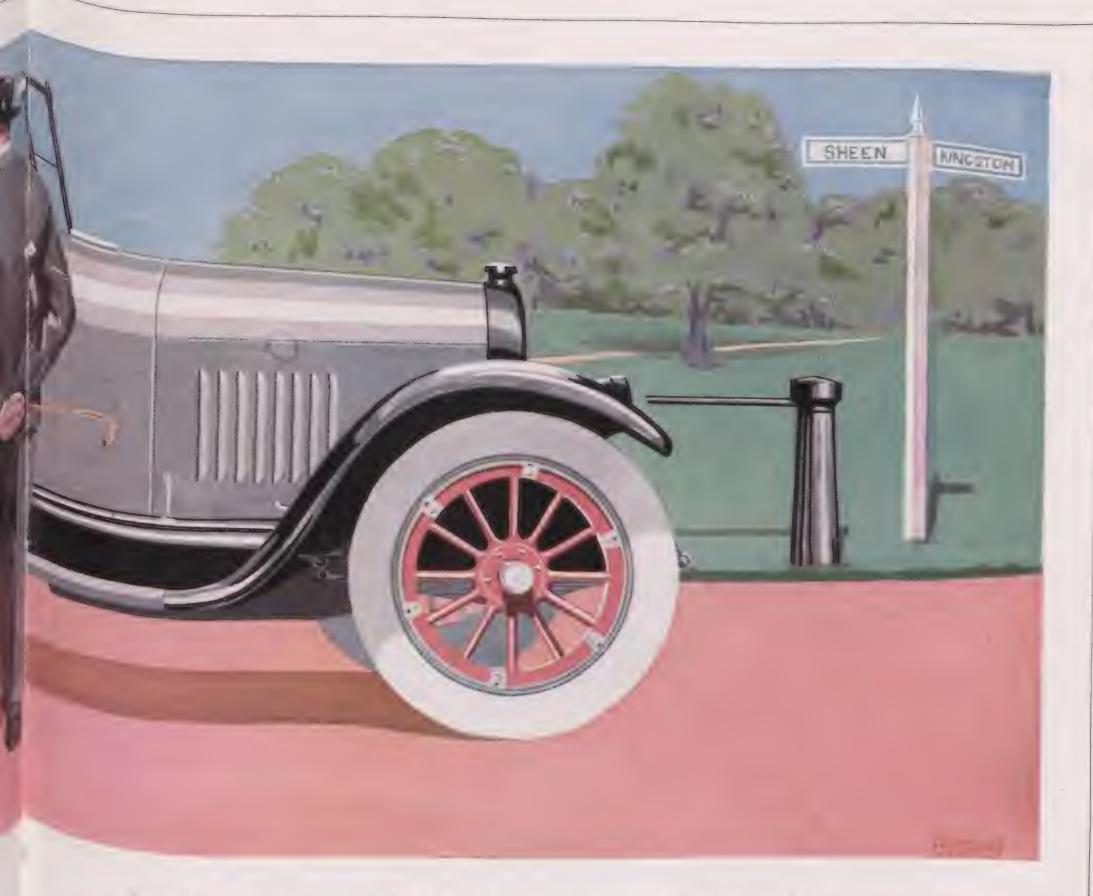








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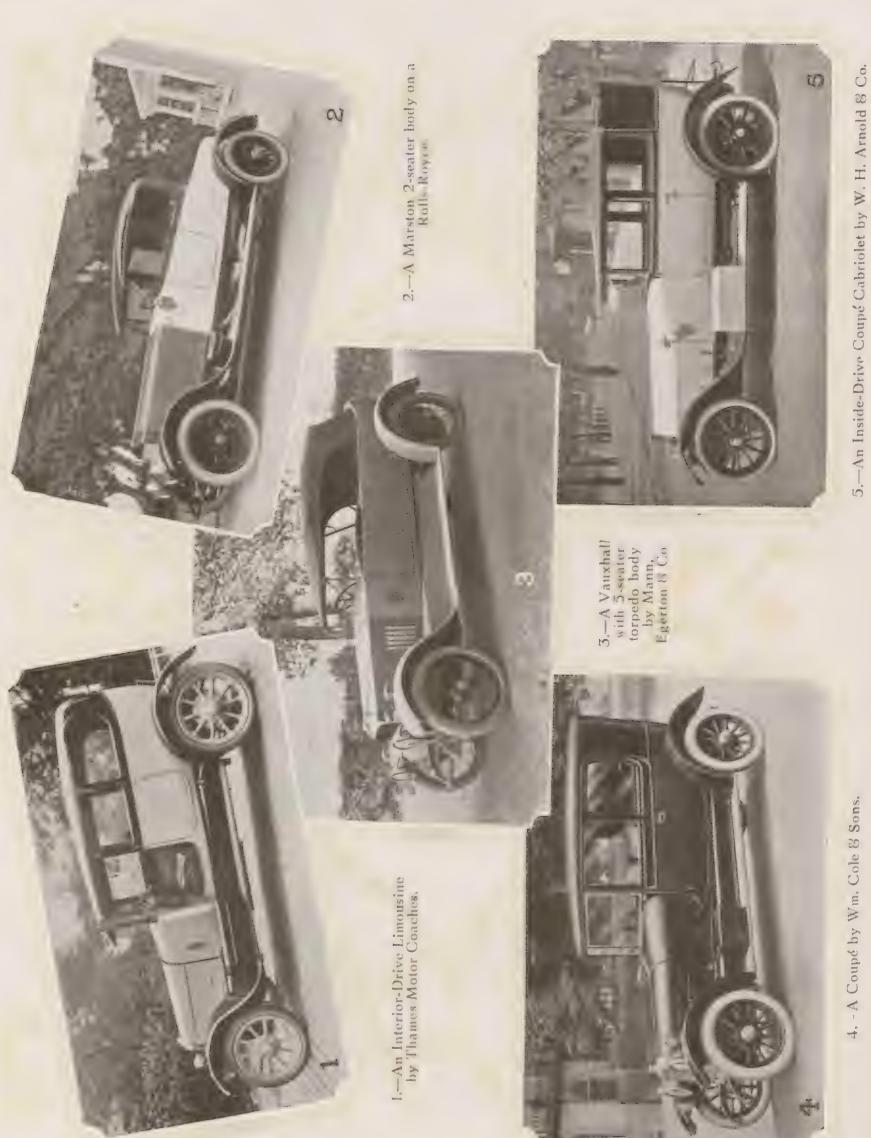
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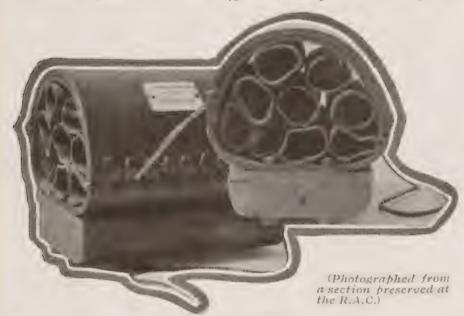
SOME EXAMPLES OF BRITISH COACHWORK. (III.)



4. - A Coupé by Wm. Cole & Sons.



ROGRESS in motor tyre design has been, above all things, unobtrusive. Viewed in perspective over a period of years, of course, the remarkable nature of the development, from the original Thompson pneumatic of 1845 to the tyre of to-day, is



The Original Pneumatic Tyre (Thompson's Patent) of 1845.

appreciated, but there are really very few landmarks of which one can say that their presence marks a definite

move forward toward perfection.

The old troublesome, but wonderfully welcome, Dunlop cycle tyre of 1888 was exactly the same in principle as the largest motor-car tyre of thirty years later. The facts that only a trained member of the manufacturer's staff could fit the former, whereas, with the aid of certain trouble-saving devices, a child can fit the car tyre of to-day; that a simple puncture required an hour's work to repair then, while now a delay on the road to replace a damaged tyre need occupy a few minutes only—these are the things that bring home to one the real nature of the improvement that has taken place in the interval.

Looking back over the years, one has to admit that the development has been along very orthodox lines, in spite of the fact that the pneumatic tyre has been responsible for more heterodox and, needless to say, absolutely impossible,

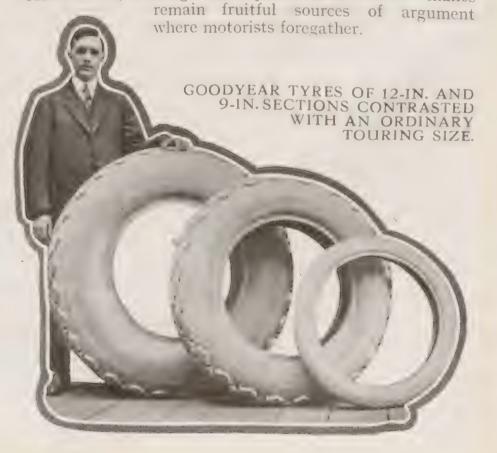
inventions than any other imaginable article.

When one says that no alteration in principle has been made in thirty years, it is necessary to modify the statement. The actual principle of the interposition of a cushion of air contained in a rubber tube, the latter being protected by a thick cover of rubber re-inforced with canvas or other

material, between wheel and road, remains of course; but the method of application varies a good deal in these later days.

To take the one matter of retaining the tyre on the rim; this was accomplished originally by the liberal use of solution; this, so far as cycles are concerned, developed into the wired-on type of cover with which everyone is familiar. This system, while quite satisfactory with very small tyres, could not be used for the larger articles required for motor-cars before the days of demountable rims, and the beaded-edge cover was evolved. One firm of tyre makers alone retained the wired-on idea in conjunction with a detachable flanged rim, and Goodyear tyres to-day are still made on the straight-sided, wired-on principle. some 126 piano wires being used to afford anchorage.

Some little divergence of opinion exists as to the relative merits of woven canvas or parallel cords as a foundation for the outer cover, Palmers and Goodyears being of the latter type, although on different lines, while other makers continue to use canvas. With this exception, and that of a variety of treads as wide as the numbers of different makes —which is, after all, more a matter of pattern than principle —modern tyres, save in the case of special creations such as the Rapson, differ remarkably little in method of construction, although the capabilities of different makes

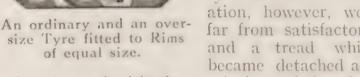


Perhaps the greatest development in the whole history of the pneumatic tyre, since it became in any way a practical article; is that of the non-skid tread. We were so content in early days to save our bones by the use of fat, smooth rubber tyres, after experience of nerve-racking solids, that what little skidding needed to be guarded against seemed a small price to pay for the inestimable advantages of pneumatics. But as the speed of cars increased, we began to realise that the price was heavier than

we thought, and had to be paid, on occasion, in currency of human lives.

So the non-skid tread became a necessity, and took the form—in the case of the Samson, for instance—of steel studs embedded in a leather band

and affixed to the existing tread of the tyre. Methods of affixation, however, were far from satisfactory, and a tread which became detached and



whipped round with the revolutions of the wheel became almost as great a danger as the skidding which it was supposed to guard against.

Again improvement was required and was shortly forthcoming. This time the form taken, of course, was a perfected method of embedding the metal studs in the material of the outer cover itself, and although it was some years before this principle was put into thoroughly practical application, the introduction of the non-skid tread, as we know it to-day, certainly marked a distinct epoch in the history of the pneumatic tyre.

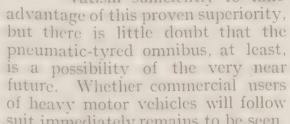
It is safe to say that this tyre alone has made possible the highly efficient, fast and comfortable modern car; and yet, considering the load of opprobrium that has been heaped upon it, one would be tempted to think far otherwise—that the car had been perfected in spite of, and not because of, its tyres. It was at first seriously doubted if a tyre could be made to withstand the greater weight and speed of the motor-car, as compared with the bicycle, and a fair sample of our experience of those early days was given by Mr. S. F. Edge recently in a description in a contemporary of some of his troubles with a Gordon-Bennett racer. If memory is not at fault, his tyre mileage was usually somewhere about 50 before dissolution, following upon a short history of more or less constant disintegration, occurred.

Things were not always quite so bad as that, and, anyway, eventually the motor-car tyre arrived in practical form. Many of the troubles of those, as well as later, days were due probably to under-tyring. The maker of the car fitted rims for tyres of a certain size, and if—as very often happened—his estimate of the tyre-size necessary to carry the weight of his car was incorrect, the purchaser suffered. He might possibly have his wheels rebuilt and larger tyres fitted; but nowadays, fortunately, it is possible to remedy such an error more easily and less expensively.

Most tyre manufacturers stock "oversize" tyres, which is to say, a tyre having a greater than normal air space which will fit an existing rim of given dimensions—a point that is graphically demonstrated in our illustration.

> This question of the capability of the pneumatic tyre to carry great weight has arisen again to day,

curiously enough, in connection with commercial vehicles. No argument is possible, since it has long been proved in America that lorries-or "trucks" as they are called there—of five or seven tons capacity will run better from every point of view on pneumatic than on solid tyres. We, on this side, have not vet conquered our national conservatism sufficiently to take



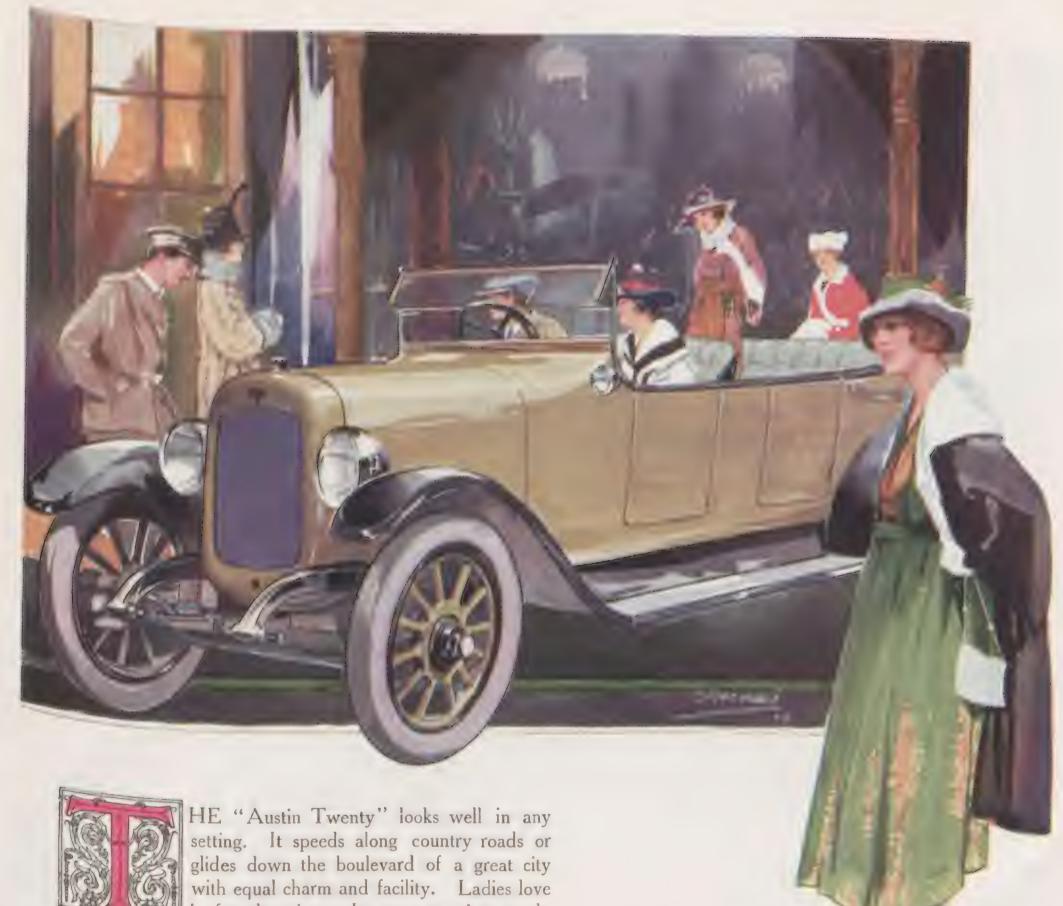
of heavy motor vehicles will follow The "Palmer Cord." suit immediately remains to be seen.

If they decide to do so, tyres of diameters ranging up



The last word in Dunlops — the "Magnum."





it for shopping. Its easy steering, ready

response to every impulse of the wheel, admirable selfstarting equipment that eliminates much irksome work, render it ideal for a saunter through Town.

Private owners began to take delivery in October, and already call it "the Car of all the Comforts." Visitors to the Olympia Motor Show should not fail to examine the "Austin Twenty" on Stand No. 54

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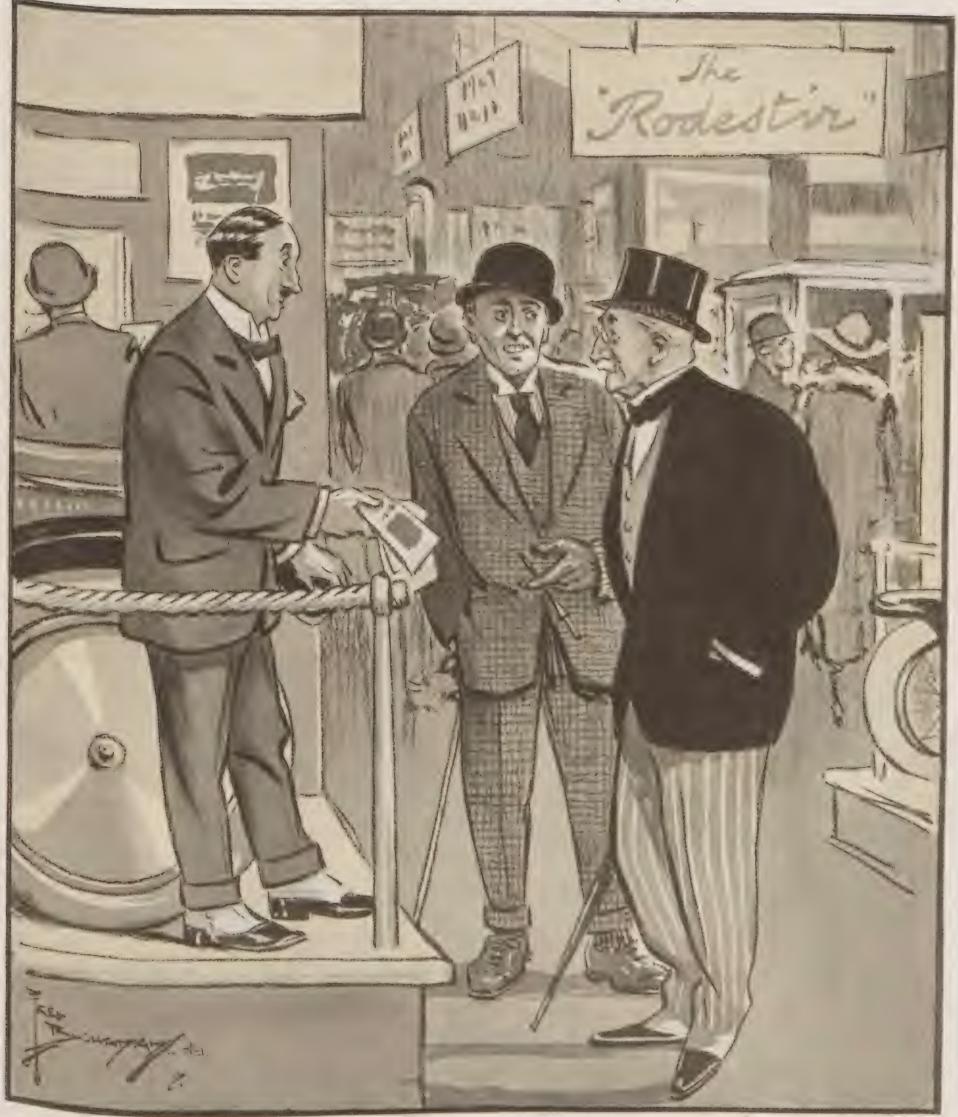




Polax Some Starter"! Electric Starting & -Dynamo Lighting Equipment "Makes any Car a better Car" This drawing of the starter shows it On the ngine firing, the starter is automatically thrown out with its toothed wheel in engagement with the toothed periphery of the engine flywheel. The engagement is automatically rade when the starter switch on the dashboard is operated. engagement. Every starter fitted has an ample reserve of power, and has proved equal to the heaviest demands made upon . Stand No. 254 Olympia Show THE ROTAX MOTOR ACCESSORIES WILLESDEN JUNCTION, LONDON, COMPANY LIMITED N.W.10



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HROUGH narrow, winding, peaceful lanes you travel two miles from the old town of Epsom, when suddenly your car turns through a gateway, and you find yourself confronted by a mansion

of imposing architecture -a noble house of white stone and an air of historical association. Facing it, and stretching as far as the eye can see, is a golf course that arrests the attention immediately; a course that conveys the impression of splendid expansiveness with its gentle, picturesque undulations, rising ever higher, until the topmost of them meets the horizon 400 ft. above sea-level; its wide, sweeping fairways and its capacious bunkers.

This is Woodcote Park, the country home of the Royal Automobile Club. Every week-end the green is crowded,

and yet I am certain that there are thousands of members who do not realise that a rural retreat so beautiful stands at their disposal within a short run of London. That, however, is hardly matter for surprise. The property was purchased



in 1912 but, on the principle that a good thing deserved the best treatment, the committee gave unlimited time, as well as money, to the construction of the course.

It was almost ready when the war broke out, but it was not opened until the spring of 1915, so that for four years its light was overshadowed by a conflagration of a fiercer and very different kind. Only now is it coming into its

at all costs you must be strong enough, and that if you are a trifle too strong you will be of a surety in a hazard beyond the green. This is the kind of golf that grips the mind all the while.

Hardly could the situation of the course be happier. On one side is Lord Rosebery's famous seat, the Durdans, with its long line of majestic trees. From the higher holes

picturesque valleys and woodlands meet the eye in the distance, and within a stone's-throw of the sixth green is Epsom racecourse. Indeed, on Derby Day, you can walk through the club's private gate just beyond the sixth green, and take your seat in the grandstand in the last five minutes prior to the beginning of the race.

One point that strikes the visitor to the R.A.C.'s home of golf is the excellence of the bunkers—and bunkers, just places of tribulation, are among the worst features of many inland courses, because of their hardness and lack of sand. Here you obtain something like the true seaside



THE ENTRANCE HALL.

kingdom. At the start, too. a separate subscription had to be paid for membership of the golf club, but its privileges have since been thrown open to everybody who belongs to the famous institution in Pall Mall.

In all sincerity would I say that it is as fine an example of a park course as I have seen in solfing pilgrimages to many parts at home and abroad. Designed by Messrs. W. Herbert Fowler, and T. Simpson, it has character at every hole;

for while the fairways are 40 or 50 yds. wide, always has the tee-shot to be placed in a certain part of the course if the hole is to be opened up for the second shot. Except at the shot holes, there are very few hazards across the line of play. The bunkers stand guard on right and left and make the straight path narrower and narrower as you accomplished through an opening which affords very little margin for misdirection.

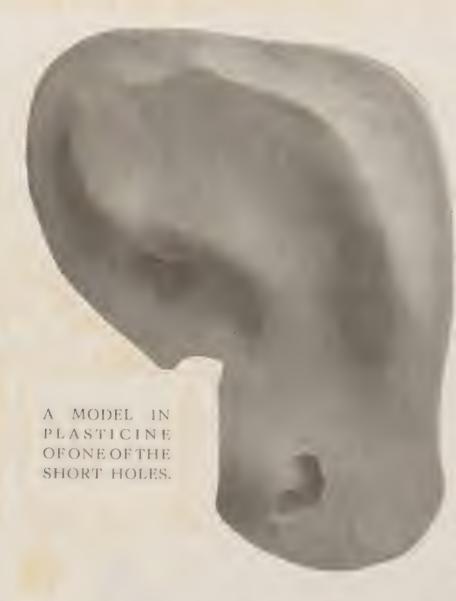
And unless you have placed your drive in the correct spot, you will usually have one of these encroaching bunkers beside the green to carry with the iron or mashie—a task that provokes a great deal of thought, seeing that



THE R.A.C. COUNTRY CLUB AT WOODCOTE PARK.

effect; large hazards, through which a mis-hit ball will not run, and which afford opportunities for proper bunker shorts in fine, loose sand a foot deep.

The golfer does not want to enter the clutches of a bunker, but when the perverse fates direct him into one he likes it to be a real bunker. And as often as not on inland greens he finds merely a clay pit. This feature of Woodcote Park, and the well-kept character of the turf, and the generous size of the putting-greens, combine to produce the sense of golf as one likes it to be and as one



seldom discovers it in a park. Rich as the surroundings are in woodland beauty, there are no trees near the line of play. Ten thousand of them were cut down in the construction of the course.

Where there are so many good holes, it is difficult to pick out three or four for special mention, but I believe that any golfer who may visit Woodcote Park will come away with particular recollections of the third, fifth, and fifteenth. The third is a curiously deceptive short hole of 170 yds.

It is a club tradition that three people out of every four who play it for the first time and hit clean shots from the tee find themselves in the bunker guarding the green. Somehow that bunker looks little more than a mashie shot away, whereas the carry is 130 yds., and the ball has to be in strong flight even then, because the highest part of the hazard is the bank at the back of it. There are two bunkers to the right, and there is a long straggling bunker to the left, but this one in front of the green catches more shorts than any other on the course.

The charm of the fifth lies in the obvious test of accuracy that it presents from the moment you step on the raised teeing-ground. The drive must be placed to the left so as to open up the way for a mashie-shot on to a plateau-green. If you hit the correct drive over twin rows of bunkers, separated only by a strip of rough, the approach is plain sailing; but if your tee-shot is to the right, you have a very difficult approach over a shaggy slope with the danger of going too far haunting the back of the mind.

The fifteenth is a very fine drive-and-iron hole with a double green. Sometimes the pin is on the high ground to the right, in which case you must drive to the left so as to make the iron shot a practical proposition; but you have to be very careful of your hugging of the left with the drive because the natural fall of the ground is in that direction, and if you are a natural puller, with a way of overdoing the pull at times, you may find yourself in perdition down the rugged hillside. When the pin is on the lower ground to the left, you drive to the right so as to have the fall of the ground to help you with your iron shot. It is a splendid hole whichever way it is played.

I liked, too, the sixteenth, with its carry of 165 yards over rough ground and bunkers from the tee, and its iron shot through a gully, twelve yards wide, on to the green. If you take this gully path, you are safe—unless you go down the slope beyond—but if you are off the line, there is certain trouble, including a bunker on the putting green, about eight yards from the pin.

Such are some of the features of the R.A.C.'s country home. Others include two croquet lawns, four hard courts and four grass courts for lawn tennis, and very fine crops of vegetables and fruit, including peaches (of which 2,000 have been gathered in a year), grapes, figs, and nectarines. The mansion was built in about 1650 by Richard Evelyn—brother of John Evelyn, the diarist—on the site of a monastery.

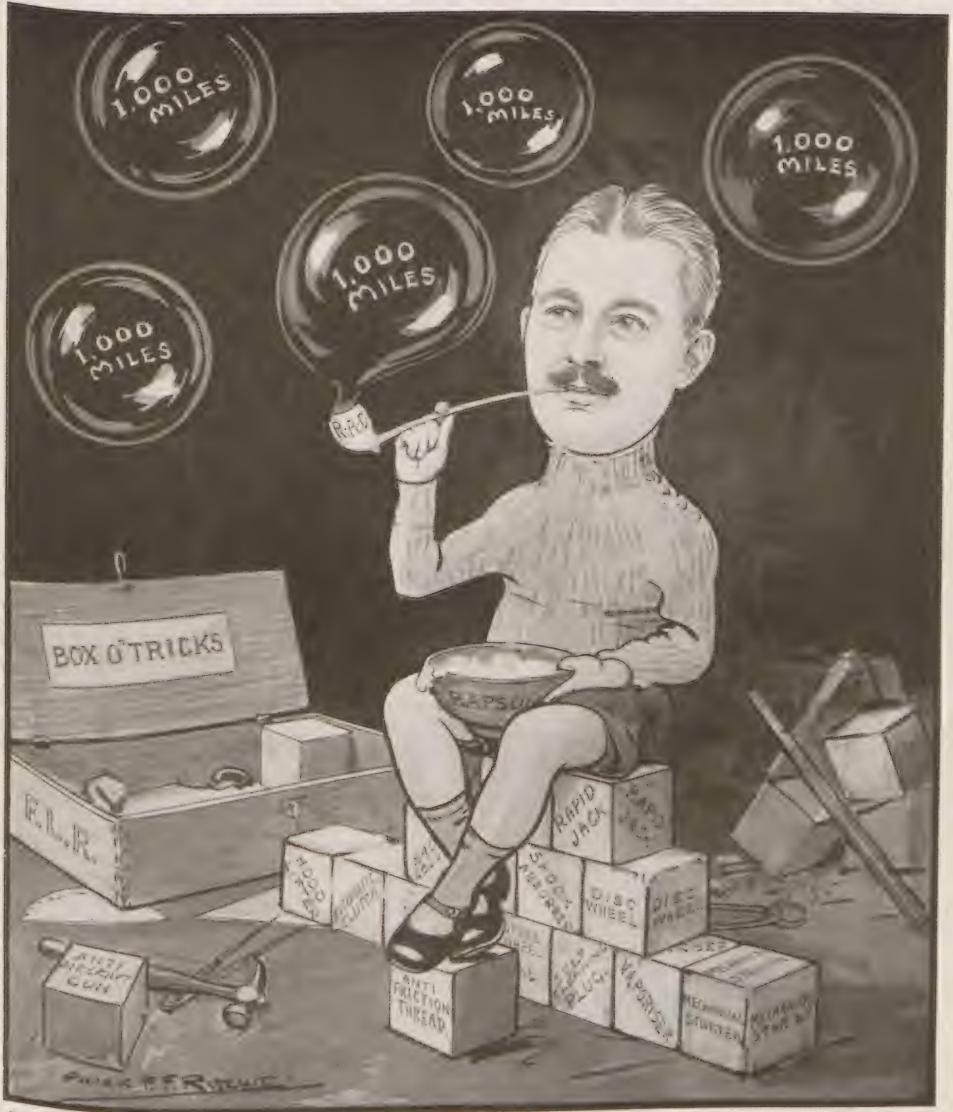
Originally the club had twenty-seven holes. Of these, nine were given up for the purpose of a camp and the cultivation of oats and potatoes. But the eighteen holes course remains, and lucky is the golfer who has the privilege of playing over it. It was born in the stress of wartime, and I think that the secretary, Mr. F. Holroyd, is to be very heartily congratulated on its evolution.

R. ENDERSBY HOWARD.



THE BUNKER GUARDING THE THIRD GREEN.

UNPUNCTURABLE BUBBLES: CAN HE BLOW TEN?



MANY AS ARE THE INVENTIONS WHICH MR. F. LIONEL RAPSON HAS PRODUCED, NONE HAS EXCITED MORE INTEREST THAN THE TYRE WHICH IS NOW UNDERGOING A 10,000 MILES TEST UNDER R.A.C. CONTROL.

A TABLE OF DIMENSIONS. In the table below are stated the principal dimensions of the engines of cars which will be available for inspection at Olympia, together with the provisional prices either of chassis or complete vehicles, where this information has been ascertainable.

Make.	H.P.	No. of Cyls.	Bore.	Stroke.	Price.	Make.	H.P.	No. of Cyls.	Bore.	Stroke.	Price.
A.B.C	12	2	3·6 in.	3.6 in.	195	Hotchkiss	18-22	4	95	140	1,075 Ch.
Albert	12	4	68	103			IO	4	65	120	180
Angus-Sanderson	14	4	76	127	450	Humber	15'9	4	80	140	750
Armstrong	~~1	7	1	/	1	Hurtu	14	4	75	120	800
Siddeley	29.5	6	3½ in.	5] in.	660 Ch.	Isotta-Fraschini	40-50	8	80	130	
Arrol-Johnston	13-30	4	75	150	700	Itala	15.9	4	80	130	
Austin	20	.4	95	127	495	King	30	S	3 in.	5 in.	800
A-C	10	4	66	109	395	Lagonda	11.0	4	67	77.8	288
Bayard	15.0	4	80	140		Lanchester	40	6	4 in.	5 in.	1,500 Ch.
Bean	11.0	4	69	120	. —	Lancia	40	12	80	107	
Belsize	20	4	90	IIO	540	Little Midland	8	2	85	85	205
Berliet	15-20	-1	90	130	525 (A)	Mascotte	10	4	69	IIO .	450
()	12	4	65	IIO	520 Ch.	Mercury	IO	4	64	102	375
Bianchi	1.1-20	4	75	120	710 Ch.	Meteorite	11.9	-4	66	109.2	450
	20-30	-1	95	130	930 Ch.	Minerva	20	4	90	140	990 Ch.
Brasier	_	-1	85	150	710 (B)	(30	6	90	140	1,185 Ch.
Buick	18.2	6	33 in.	4½ in.	700	Morris-Cowley	11.9	4	69.5	102	315
Cadillac	20-30	8	3½ in.	5! in.		Morris-Oxford	11.0	4	69.5	102	360 Ch
Calcott	10.5	4	65	110	335	Napier	40-50	6	4 III.	5 in.	1,750 Ch.
Calthorpe	10	4	65	95	367-10	Oldsmobile	26.9	8	73	120.6	710
Chandler	29.4	6	89	127		Overland	18	4	85.7	127	475
Charronette	IO	4	63	IIO		Paige-Detroit	29.4	6	3½ in. 80	5 in.	278 55.
Charron-Laycock	15	-1	85	150		Palladium	10	2		107	,
Chenard-Walcker	12	-1	75	150	_	Damband (12	4	70 85	140	700
	(15	-1	80	150		Panhard	18-22	4	6.5	140	1,250
Chevrolet	19.6	-1	311 in.	4 in.	C1	Peugeot	10	4	105 66	105	400 (A)
C1	12	-1	80	120	610 Ch.	T)1	11.0	4	69	100	390
Clement-Talbot	25	+	101·5 80	1.10	850 Ch.	(16	4	85	130	
Coamos	36	6		130	900 Ch.	Piccard-Pictet	30	8	85	130	
Cosmos	10	3	75 101·6	75 140	850 Ch.		15.8	4	80	140	
4	25-30 30	6.	90	130	1,060 Ch.	Renault	37.2	6	100	160	
Daimler }	45	6	110	130	1,300 Ch.	Rolls-Royce	40-50	6	114	121	1,575 Ch.
	16	4	85	130	750	Rover	12	4	7.5	130	700
Darracq	27.6	8	75	130	7,50	Ruston-Hornsby	16-20	4	80	130	
Dawson	11.0	.1	69	120		,	20	4	93	100	550
Day-Leeds	10	4	64	100	400	Scripps-Booth	18.9	6	211	43	695
Deemster	10	.1	62	90	362-15	Singer	IO	4	. 63	88	350 Ch.
	12	4	70	100	390	Sizaire-Berwick	25-50	4	95	160	
De Dien	14-16	8	60	100	600	S.P.A	25-30	4	100	140	
De Dion	20-24	-1	85	130	800		35.5	4	IIO	160	_
	20-24	8	70	120	875	Standard	9.5	4	62	IIO	
Delage	23.9	6	80	150	1,075 Ch.	Star	15.9	4	80	150	
Delaunay-	17	-1	85	130	88o (C)		20·I	4	90	150	
Belleville	30	6	88	150	1,680 (C)	Straker-Squire	20-25	6	80	130	1,100
	.4050	6		160		Sunbeam	16	4	80	150	
D.F.P	12-14	4	70	130	675 Ch.		24	6	80	150	
Duplex	10	8	56	75	393-15	Swift	12	4	69	130	350
Enfield-Allday	10	5	63	80	295	Thor Varley Woods	15.2	4	19	120	660
Ensign	25	6	3½ in.	5½ in.	Manufacture and	4	11.9	4		140	1,350
Farman	40	6	100	140	~ 20	Vauxhall	25 30–98	4	95 98	150	1,050 Ch.
F.I.A:T.	12-16	4 ,	65	110	530	Vermorel	12-16	1	74	130	
Grahame-White	23	-1 I	64	85	350	(15-20	4	80	130	
Grégoire	12-30		70	64.5	85 500 (D)	Vulcan }	20-25	4 8	70	115	545 Ch.
~ 1	20	4 8	70 72	130	590 (D)	}	12	4	69	120	406 5s.
CITIE	10.8	4	66	100		Waverley	15	4	75	120	490
T I	11-22	4	69	150	275 425	Wilton	11.0	4	69	100	
Hampton	10	+	63	1,20	375	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	16-20	4	90	121	675
A ACCESS COIS				120		Wolseley		6			875
	11.0	- 1	(3)								1 1//
H.E Hillman	11.0	4	69 65	120	315 370	Wolseley	24-30 30-40	6	102	130	1,075

A Plus duty. B Price of Chassis delivered in Pan Chas: price; cost of neight and duty additional. D—Chassis price, without tyres, delivered in London. Ch.—Chassis price complete.



OMFORT in an automobile is the only thing that matters. It is the attribute to which every effort of the designer is directed, the one desirable quality to which every improvement term. Comfort is, indeed, an all-embracing

The criticism is levelled against the English language that it is inexpressive; that, unlike certain Latin tongues, in which a mere term may convey a whole series of interconnected thoughts, in English each idea must be clumsily clothed in many words. The word "comfort," as applied

The dictionary defines the noun as indicating "ease, quiet enjoyment, freedom from annoyance." Does not that definition exactly describe the qualities which we demand of our cars? Ease conveys the idea of perfectly designed seats, in which one sits naturally, without requiring to exercise muscular effort to maintain a natural, restful position. Quiet enjoyment precisely determines the quality of pleasure which one derives from indulgence in the pastime, while freedom from annoyance seems to sum up the whole situation.

Comfort, however, is largely a matter of degree. We may have, at one end of the scale, a car that is frankly uncomfortable, and at the other end the most luxurious car imaginable to-day; but there is a whole range of vehicles between, the owner of each or any of which would use the word "comfortable" to describe his possession. Even that superlatively luxurious car is susceptible to additions, in the shape of separately purchasable accessories, which increase its degree of comfort.

Here another factor enters into the question—the personal element. It is difficult to say where comfort ends and mere luxury begins; difficult, indeed, to decide whether luxury is not simply a superior degree of comfort. But, in any case, at this point in the ascending scale one man may positively demand that which another man regards as superfluous.

The non-smoker, for instance, will have little sympathy with the car-owner who insists upon an electric cigar-lighter in the interior of his Pullman limousine because carrying a match-box ruins the contour of one's waist-coat, don't you know!" And

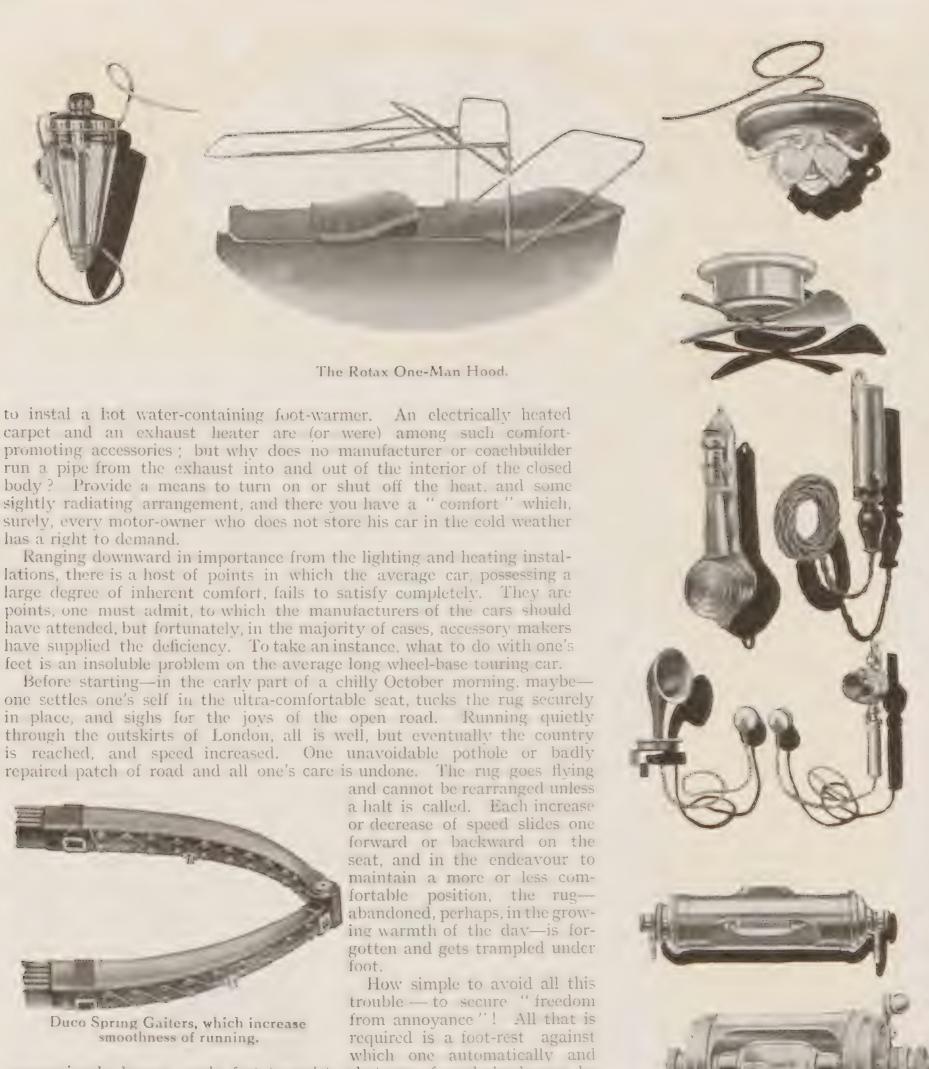
yet, have there not been times when, on an open car, one has hesitated to pull up merely to light a cigarette? With an electric lighter depending from the dash, one would have obtained the desired light with ease; might have leaned back and consumed the cigarette with quiet enjoyment; and this with freedom from the annoyance to other passengers which a halt for so trivial a purpose might have caused. From the point of view of ten years ago, a cigar-lighter is certainly a luxury, but in these days of universal dynamo car-lighting it is a very ordinary accessory, and a quite excusable addition to the comfort of the car.

The extent to which the equipment of the chassis with a charging dynamo has added to our comfort is scarcely realised; but, if the motorist of some years' standing will think back, he must wonder how on earth we ever managed to exist without it. Interior lighting of closed cars can be accomplished by other means than electricity, it is true; but the electric lamp you can put just where its light is most serviceable, and its appearance harmonises best with the decoration. It has certain olfactory advantages, also. It is equally possible, when your gas head-lamps fail you, on a wet and windy night, to descend into the mud and re-charge the generator; but——!

It is rather curious, by the way—the standard of comfort having reached so high a level in most respects—that in one matter every British car falls short of perfection, although, it may be, some American vehicles are better equipped. This is in the matter of interior heating. There

are devices on the market, or were before the war, to remedy this shortcoming, and, of course, it is always possible





unconsciously braces one's feet to resist whatever of road shock may be transmitted in spite of efficient springs. Add to this what is technically known as a robe-rail, and the rug is satisfactorily disposed of.

Many pages might be filled, however, with references to the various comfort-promoting accessories. We have, instead, illustrated a selection of such devices, including a Rotax ventilating fan, a telephone of the same make for communicating with the driver from the interior, and a remarkably neat Rotax hood; Duco cigar-lighters and spring gaiters, C.A.V. dash-board lamps, and some excellent specimens of roof and brougham lights.



MPROVEMENT may be piled upon improvement, and the motor-car brought to a stage very closely approximating ultimate perfection, but always there will be certain operations that must be performed in running well.

These operations are beyond the power of car manufacturers to eliminate, since the carburetter must be supplied with fuel, and the bearings with oil; tyres must be inflated, changed and repaired; the car must be washed, the piston and combustion-heads cleared of carbon, and so forth. But if the manufacturer can do little, the accessory maker can do, and has done, much to render these operations simple and rapid to perform by the introduction of various time and labour saving devices.

The processes to which time-saving can be applied automatically fall into two categories with two subdivisions: A (I) those which form a part of regular garage routine, and (2) others which become necessary periodically at comparatively regular intervals of distance travelled; B (I) processes which are required on the road normally, or (2) owing to accident. The important category, obviously, is "A," since undoubtedly the best time-saver of all on the road is one that cannot be purchased—fore-thought in the garage.

What are the processes under the different headings? Well, here is a list of the more important, and it will be noticed that A (1) and A (2) are as heavy as B (1) and B (2) are light; also, that the heaviness or lightness of B (2) depends upon forethought or the absence of it—and luck:—

A (1)—DAILY GARAGE ROUTINE: Cleaning and polishing of carriage work and metal fittings; refilling of fuel and inflation of tyres and repair of punctured tubes or gashed covers

A (2) PERIODICAL GARAGI ROUTINE: Decarbonisation of cylinders: recharging of grease cups, wheel bearings, gear and differential boxes with lubricant:

testing of electrolyte (if electric lighting) for quantity and quality; checking wheel alignment, in case of rapidly-

wearing tyres; and, in fact, general inspection of car for necessary adjustments.

B(I)—NORMAL ATTENTION ON ROAD: Refilling of tanks. B(2)—ABNORMAL ATTENTION ON ROAD: Changing tyres, wheels or rims; temporary repairing of tyres, if necessary; execution of minor repairs in the event of mechanical derangement.

This list is long; but it is not fearsome when one considers that, given good luck and the careful attention at home of which a good car is worthy, the worst that should happen to one on the road is that, the run having exceeded the fuel capacity of the tank, the spare can of petrol must be emptied in. This used to be a thoroughly messy and sometimes a tedious job, involving much



A FOOT PUMP, THE RAPID RIM, THE ATLAS POURER, AND THE "LECTROFLATER."



Pourer.

The Steel Barrel Co.'s Kerb Apparatus.

to come by now and again. With these, a two-gallon can may be emptied in a matter of seconds, and the delay on the road reduced to a minimum.

If one's luck is out, in spite of forethought, tyres may burst or puncture, but time and trouble savers on the market such as Rudge-Whitworth, Michelin, Sankey and a host of other detachable wheels in wood, steel, disc and wire; or with Rapid,

Warland, or other detachable rims, tyre troubles no longer hold one up for any considerable length of time. Supposing, even, that ill-luck pursues one, and it is necessary actually to repair a badly-cut cover on the road, there is a variety of gaiters of different types which may be laced over the weak spot, or the Chemico "Blow-out" patch, which forms a fairly permanent repair, may be used. Actual tyre-changing is robbed of its terrors, therefore, and even the jacking-up of the car to render it possible—in the old days a most irritating and tedlous process—is transformed into mere child's play if the car is permanently equipped with a "Rapid" jack to each wheel.

This really exhausts all the possibilities for ill of the pneumatic tyre in its worst mood, but it is always possible that some mechanical trouble may develop—although it must be said that, given proper attention in the proper place (the garage), cars and their component parts are so reliable nowadays that in the majority of cases they should never require attention on the road unless under test. But if some minor trouble does develop, the value of a well laid-out tool-box—forethought again!—will be felt.

A good example of what can be done to save time in this direction is found on the new season's Vauxhall cars, on which the near-side running-board is utilised to form a long shallow tool-box. It is indistinguishable and does not confuse the contours of the body with useless excrescences, and yet, on lifting the lid, any tool is visible at a glance, and *must* be put back in its proper place. Further than that, do not keep losing the tools you are using. Perhaps a magneto control rod has come adrift; after trying to get at the trouble with a spanner on the off-side of the car and deciding that you can do it better with a pair of pliers from the near side, don't leave the spanner lying on wing or frame. It is certain to fall into the dirtiness of the under-screen, or drop off into the road and

get left behind. And in any case, you are sure to forget where you put it when you want to use the spanner again.

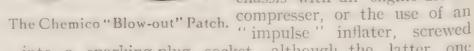
As the list above shows, however, while it is important to carry on the car a set of tools for a variety of purposes, the real

safeguard is that the car shall be properly looked to before it is taken on the road. The value of time-saving devices in the garage is equally important, even though the owner himself does not use them, for if the period occupied by such uninteresting jobs as car-washing can be reduced, or the labour of tyre inflation mitigated, the chauffeur has so much the more time, energy and interest to devote to more essential work.

The first item on our list, washing of carriage work, is covered by the Rapid washing brush, which, by the combination of hose and brush, reduces the time occupied by the operation to something like half. Filling of tanks is simplified and expedited if the Bowser or Steel Barrel Co.'s system of petrol or oil storage and delivery is installed, while even a small Lectroflater, plugged on to the electric light supply main and easily portable, will inflate the largest tyre from zero to the necessary pressure in somewhere about a minute.

Michelin compressed-air cylinders serve the same purpose, but failing these elaborations, tyre pumps nowadays are

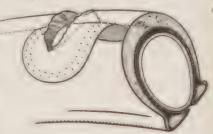
much more efficient and less laborious to use than they were, especially if a foot pump of the Wood-Milne pattern is adopted. Other alternatives are the equipment of the chassis with an engine-driven



The Rapid Cleaning Brush.

into a sparking-plug socket, although the latter, one imagines, would be of service principally on the road.

So far as periodical "greasing-up" is concerned, there are various grease guns on the market by means of which heavy lubricant may be forced. into places where it is reluctant to go, while electrical accessory firms usually stock a hydrometer especially adapted to



The Patch in position.

show the density of the acid in the accumulators, which should be exactly 1.225, and in quantity should just, and only just, cover the plates.

Special brushes can be obtained for removing external dirt from engine and chassis generally, and as to interior cleaning of cylinders, there is no longer need, happily, to take the engine down to accomplish it. Liquid decarbonisation processes have been tested and found satisfactory; but if one wishes to be mechanically sure of a clean engine special tools are obtainable which can be inserted through such an orifice as that left by removal of a valve cap and used to actually scrape the piston head and combustion

Altogether, therefore, motoring has been made easy, not only by the gradual perfection of mechanism so that a car is now a remarkably reliable article, but by the simplification of every process which once upon a time was previewed with dread.

The Ocial Mainel

HE International Motor Show at Olympia has been always as much social as technical, and the thirteenth exhibition, which opens on November 7th, is going to be so interesting that I shall be surprised if the last attendance record—there were over a quarter of a million visitors in 1913—is not exceeded. Thursday, November 13th, will be Society's day, when the price of admission will be 10s. up to 6 p.m. I don't know if anyone will try to beat M. Poincaré's record at the Paris exhibition last month. By dint of steady heeland-toe walking he accomplished his tour of the Grand Palais exhibits in 1 hour 23 minutes 6 seconds, easily beating M. Loubet's previous

best of 2 hours 4 minutes. But I doubt if "hustling round" will be a feature of this year's Olympia Show, for prospective purchasers are bound to be more numerous than at any previous exhibition.

Lessons of the War.

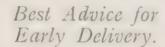
I am told that many of the 338 exhibitors are keeping the complete nature of their exhibits fairly dark, while some of the cars can only be completed on the very eve of the open ng, all of which will add to the interest and the expectation of the great day. "Full-up" was the order as far back as last May—to the disappointment not only of certain new British manufacturers, but of some American and Continental exhibitors



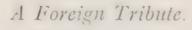
A RECORD MUSTER IN THE CAR ENCLOSURE AT NEWMARKET ON CESAREWITCH DAY.

as well. The general public will be probably most interested in the changes in motor manufacture brought about by the war, particularly the lessons taught by aircraft practice. The increased use of aluminium, the economy in weight, which will have such an effect upon tyre

wear and general running costs, must strike the magination of those least equipped with expert knowledge.



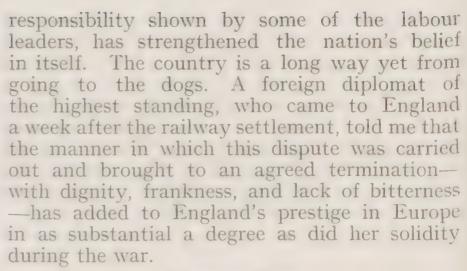
But what the average visitor will be most concerned about is the prospect of early delivery. At the moment the motor industry is practically stifled with orders. I have met many people during the last few weeks who told me that they intended to wait until the Motor Show before they placed their orders for new cars. To all of them I gave what seemed to me the soundest advice: Get your name on the waiting-list of a good firm as early as possible. That is the best means for ensuring early delivery.



Politics during the next year or two are certain to be mainly indus-

trial, and the country is bound to be faced with further labour problems in the near future; but the settlement of the railway strike and the capacity revealed by Government and People, and, one must add, the sense of

OUTSIDE OLYMPIA



A Cheerful Winter.

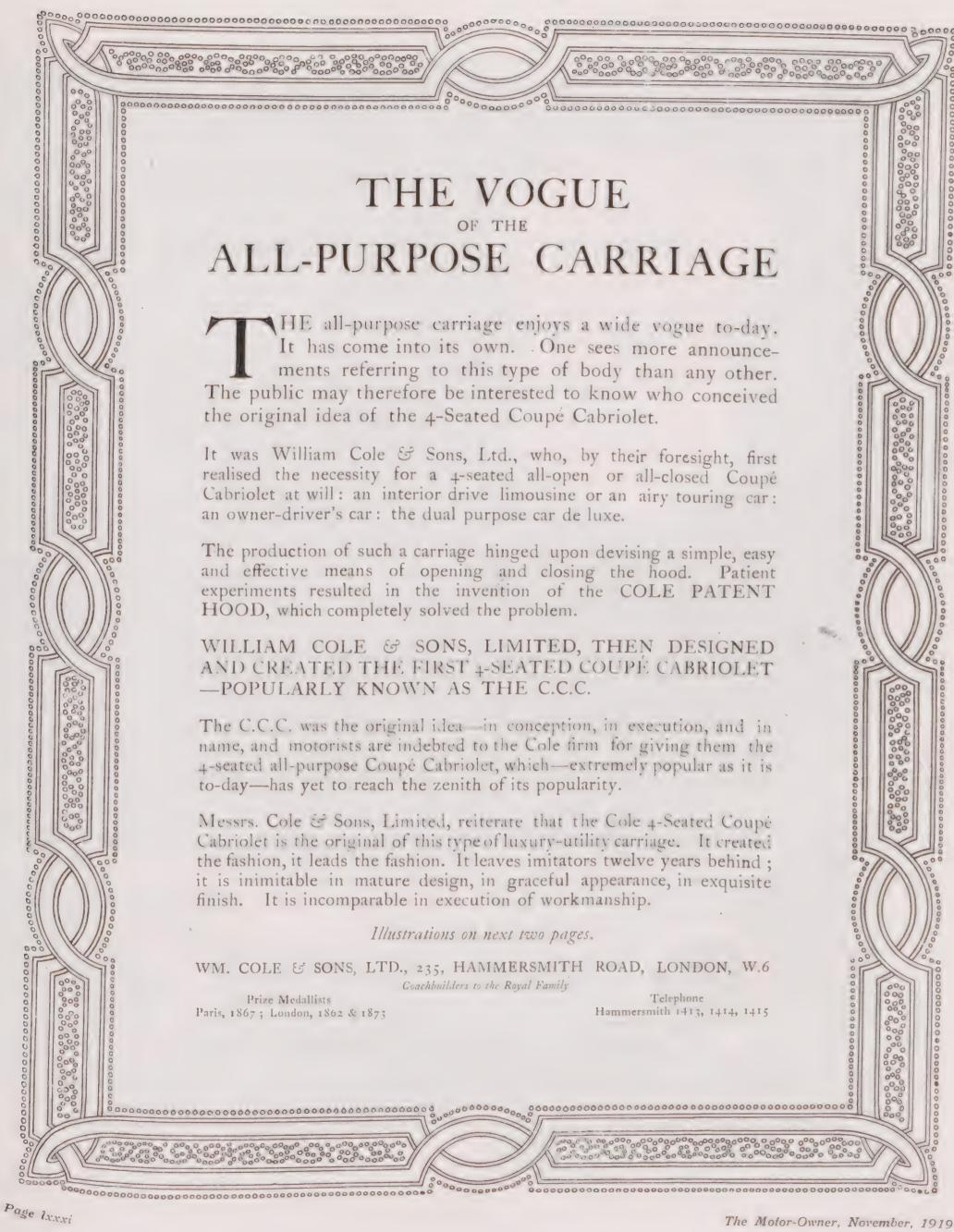
The brighter side of life had its turn again after Mr. Lloyd George and Mr. J. H. Thomas had come to an understanding. Restaurants and theatres filled up; the fashionable dressmakers are working overtime; the painters are back in town and Society has crowded to the International Society's Show, and the Chelsea circle is becoming consciously bizarre and soulful again: dancing votaries are talking of a record winter; old "Pussyfoot" folks, including the cat's-paw one, are entering upon a second edition; and it is even reported that some of the leading comedians are going to try new songs.

Back to the Private Ball Room.

One change I have noticed. The modern dances are so popular among all classes that people can get as much of them as they want in their own circle. During the war young Guardsmen and the scions of the cavalry and of the Staff were good patrons of the dancing clubs, where, at any rate, they found partners who taught them how to dance. Observers who pose as prophets said that after the war Society's ball-rooms would be deserted by these same young men, who would be satisfied only with the most expert partners. But they were wrong. The young women of Society have learnt the most up-to-date steps, too, and, on the whole, the sons of upper-class families have returned to the private ball-rooms to dance skilfully and approvingly with the sisters of their friends, and their cousins, and possibly with their aunts, for modern dress still seems to knock a few years off the average woman's MARCUS. apparent age.

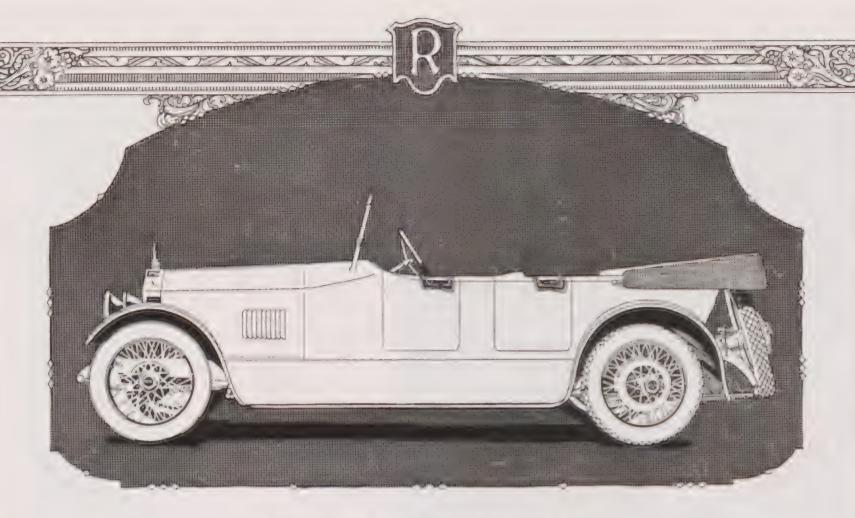
Members of the Royal Automobile Club will be accorded the use of the Princes' Rooms at Olympia, as on previous occasions. On application to the Secretary of the Club, they may obtain a special ticket admitting them to the show on Thursday, November 13th—the 10s. day—at half-price.











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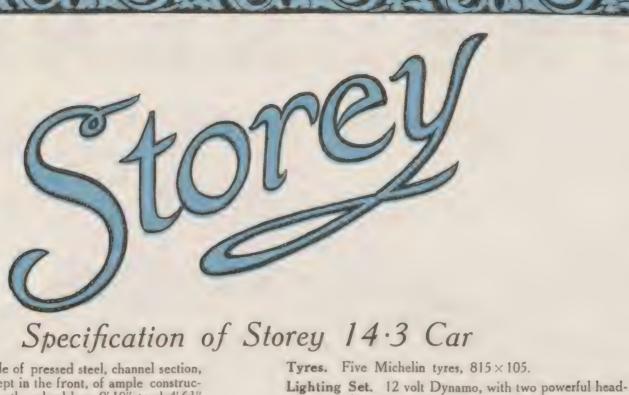
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Carburetter. Zenith horizontal.

Clutch. Ferodo cone clutch of special design.

Cooling System. Thermo-syphon, reinforced by water motor of special design.

Gearbox. Single unit type, combined with rear axle, set longitudinally in alignment with frame, three speeds forward and reverse.

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CARBURETTER PROGRESS.

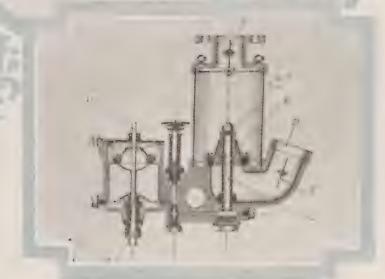
HE automobile critic has long found in the subject of carburation a peg on which he could hang his most powerful efforts. It has been said times without number that less progress of carburetter manufacture than in those of any other vital car accessory. This was undoubtedly true for the five or six years before the war, but aircraft experience has had its influence on carburation as on other things, and the last lew months have seen the public débuts of many really advanced and promising designs.

The old requirements of the car and the new requirements of the aeroplane promise well for future carburetter developments, and one firm well known in the carburetter world has produced an instrument that embodies experience in both spheres to an eminently satisfactory extent. Nevertheless it is significant to notice the number of new extra air devices and auxiliary carburetters that have recently made their appearance, which seems to indicate the existence of a feeling that the typical modern carburetter

is far from reaching finality in design.

Some Modern Carburetters.

The Godward is a new carburetter that has just emerged creditably from an R.A.C. test conducted on two Ford cars, weighing respectively 2,205 lb. and 2,220lb.



The Godward.

valve. F.—Butterfly valve. G.—Jet. D.—Air inlet. E.—Air
fully loaded. The respective petrol consumptions were 26'92
and 29'I m.p.g., and the report states that the engines
started up easily at all times without previous flooding of
the carburetter, and, what is more interesting still, that no
600 miles of the trial

The new feature of the carburetter is in effect a variable choke, though in operation it is different from what is usually understood by the term. Surrounding the jet is a valve closing entirely the air entry into the mixing chamber, but as the throttle is opened this valve is also opened against the action of a spiral spring. Thus, when the engine is running at small throttle openings, the orifice

through which the air passes into the mixing chamber is very much restricted, so that the velocity of the air is kept high and the suction of the engine is largely concentrated on the jet. The result is a rich mixture which should be thoroughly vaporised by the unusual air velocity. As soon as the throttle is opened the air valve surrounding the jet is opened correspondingly, so that more air is admitted without any decrease in velocity. but with a diminished suction effect on the jet. Thus, when the engine is working normally, a relatively weak mixture is offered with the same provision for efficient mixing and vaporisation of charge.

THE STHENOS.

When one carburetter gives better consumption than another on a certain engine the reason is always to be 1 & 2.—Two
types of the
ClaudelHobson.
3.—The
Zenith.
4.—The
Sthenos.

found in the fact that the poorer instrument wastes fuel. The liquid is taken into the engine possibly in liquid form, or, if vaporised, in such quantities that the charge is so rich that it cannot explode at all or with only a very "woolly" effect. Acceleration is a quality desired by all experienced drivers, and it is the provision of the extra supply of fuel necessary for this desirable feature that often causes the waste leading to extravagant consumption.

The main claim put forward for the Sthenos carburetter is that it gives the power of violent acceleration without necessitating waste of fuel under ordinary running conditions. This is achieved by means of what may be called two auxiliary jets, one of which acts as a reservoir for the extra fuel supply, and is in direct communication with the atmosphere, while the other is a concentric sheath round the ordinary running jet. When the throttle is suddenly opened for acceleration the extra suction draws fuel from the reservoir into the sheath round the ordinary jet, with

AL RESTRICTED TO THE RESTREET



which it is in communication, and thence it passes into the cylinders. If the throttle be opened gradually for hill-climbing or increased speed, the effect is an increase of suction on the main jet, but not to such an extent as to take effect through the sheath. Incorporated in the carburetter is a slow-running device which leads rich mixture into the induction pipe above the throttle valve, and short circuits the main jet with its sheath.

THE S.U.

The principle underlying the design of the S.U. carburetter is the maintenance of a constant air speed past the jet, whatever the engine speed, and the necessary variable choke effect is obtained by the placing of a piston in the mixing chamber. The piston is mounted on a rod which terminates at one end in a needle penetrating the jet, and at the other end is attached a suction disc mounted on bellows and contained in a suction chamber, the whole—including the jet—being mounted at an angle of 45 degrees to the vertical axis of the carburetter. Immediately below the throttle valve a small pipe is led into the suction chamber, and the operation of the mechanism is as follows:—

When the throttle is very slightly opened the suction passing through this pipe is inadequate to exert a useful negative pressure on the suction disc of the piston-rod, and so the piston remains stationary, restricting the air passage across the jet, and so ensuring that while only a small quantity of air may pass its velocity shall be high. The needle remains projecting well into the jet, thus restricting its orifice and preventing the possibility of an over-rich mixture. As the throttle is opened the suction on the disc in the suction chamber increases, the piston rises in its guide and the needle is partially withdrawn from the jet. Thus more air can pass the jet and more petrol can issue from it, and the original designing of the carburetter ensures that the two operations shall take place at a corresponding rate, so that the proportions of petrol and air are constant. Similarly the space opened by the ,movement of the piston is made to suit the suction of the engine, so that the correct amount of air passes at a given engine

One very considerable advantage of this method of construction is that the jet orifice is of such a size that it is not easily choked by foreign matter, and the constant movement of the needle in the jet reduces the possibility of this contretemps still further. The makers of this very successful carburetter have recently introduced an "auxiliary carburetter" to assist starting with engines on which the normal instrument is adjusted to give the most economical running. The S.U. auxiliary carburetter bolts on to the induction pipe above the throttle, and may be used as a means of improving acceleration, or it may be operated independently and made to give its extra supply when the engine is being started from cold.

THE ZENITH.

The Zenith carburetter makes a powerful appeal to the average owner by reason of its excellent virtues of simplicity and accessibility. There are no working parts in the carburetter itself other than those common to practically all instruments in the way of the throttle and float mechanism; and, if the instrument be mounted on the engine in a proper manner, the whole of its interior may be dismantled in a moment by the veriest novice.

There is no attempt in this carburetter to secure the effect of a variable choke, and the constant mixture at

varying engine speeds is secured by the use of a compensating jet, which for convenience in construction, and also because it gives a somewhat better effect than would otherwise be possible, is placed concentrically round the main jet. The underlying principle of the working of this compensating jet is that it allows a given amount of fuel to pass in a given time, quite irrespectively of the suction exerted by the engine. This effect is obtained by the provision of a well at the bottom of the compensator, which is fed from the float-chamber through a gauged orifice, and has a pipe communicating with the atmosphere.

For slow running an entirely separate jet is provided, and this communicates with the body of the carburetter at the point where the throttle-valve seats. When the throttle is slightly opened a strong suction is exerted on the slow-running jet, and the strength of the mixture reaching the engine may be regulated by the adjustment of a small choke-tube. Zenith carburetters are made in two distinct types, the horizontal and the vertical, the former being for fitting to monobloc engines with a single inlet port on the opposite side to the valves, and the latter for engines of any shape. With the vertical instrument external heating is essential, of course, but with the horizontal type such heating may be dispensed with, as the instrument is in a position to receive full benefit from the heat of the cylinder walls, and also the charge receives adequate heating in its passage along the ports contained in the cylinder block.

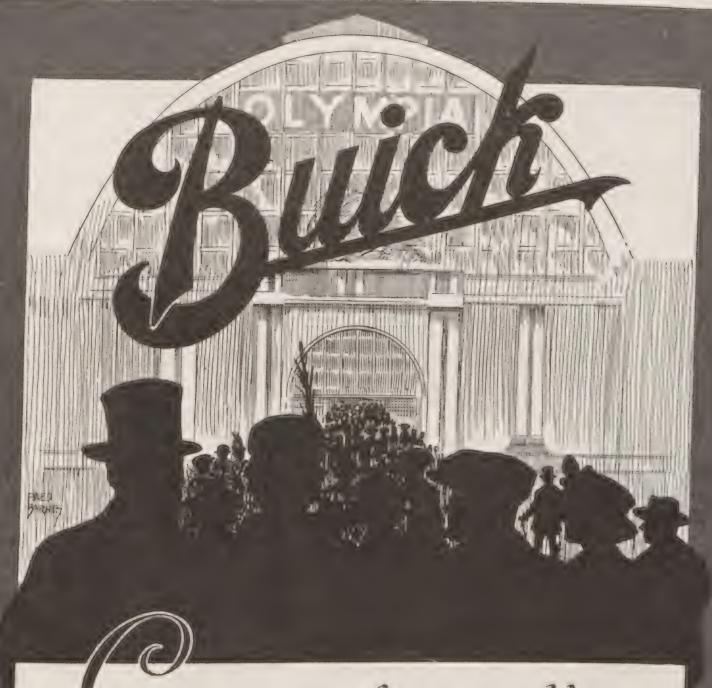
THE CLAUDEL-HOBSON.

The main feature of the Claudel-Hobson carburetter is that it is mechanically automatic in its action, but, besides the characteristic design of the jet, by which this feature is obtained, the carburetter is also noteworthy from a constructional point of view. Though a point of minor importance, this carburetter is perhaps unique in that it is constructed entirely from a single casting, so that the float chamber and the main body form a single unit. From a functional aspect the main interest of the instrument centres in the jet, which has a mechanical spraying effect on the fuel, and incorporates an air injector.

Surrounding the jet is a cylindrical jacket, at the top and bottom of which are drilled holes, the former for assisting in the spraying of the fuel and the latter for regulating the suction on the jet when the engine is running slowly. When the throttle is closed the choke-tube is automatically reduced in size by the barrel type throttle-valve, and the increased suction on the jet is compensated by the admission of air through the lower holes in the jacket, which face the main air intake, so that an unduly rich mixture is prevented, while a hand adjustment for the size of the choke—which is set once and for all when the carburetter is fitted to the engine—allows of its regulation to ensure that the mixture shall be rich enough for slow running. Slow running is also assisted by a by-pass of regular design, which is cut out of action as the throttle is opened.

The variable choke on this carburetter is one of the few attempts at achieving this feature that actually result in a variable choke, instead of a substitute that may work quite well in practice, but can never be quite the same in theory. Claudel-Hobson carburetters are made in various types to suit different designs of engine—the one illustrated being known as the N.Z. type, for ordinary touring and racing cars—but all work on the same principle, the success of which on aero engines has been no small one.

W. H. JOHNSON.



Come and see the 1920 Models at Olympia

ALWAYS one of America's most well-known cars, the Buick 1920 models, to be exhibited at Stand 79, Olympia, emphasise a degree of comfort and refinement hitherto unattainable in any cars at a similar price.

The new chassis has a six-cylinder monobloc engine of $3\frac{3}{8}$ in. bore and $4\frac{1}{2}$ in. stroke, giving an R.A.C. rating of 27.3 h.p. The overhead valves are operated by noiseless adjustable push rods, the whole valve mechanism being entirely enclosed.

Both standard models are equipped with Delco Electric lighting, starting and ignition.

PRICES:		
Model KX45, Chassis only -	-	£560
,, KX49, Long Chassis -	_	£650
, KX45, 5-Seater Touring	Car	£700
,, KX44, 2-Seater Roadster	-	£700
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GENERAL MOTORS, LIMITED, 136 LONG ACRE, LONDON, W.C.2. Telegrams: "Buickgen, London."

A New Italian Car.

Many interesting points are embodied in the design of the new Italian car known as the F.A.S.T., which emanates from the Isotta-Fraschini factory at Turin. Space was secured at Olympia by the concessionaires, and it was



THE 17:5-H.P. F.A.S.T.

hoped that an opportunity of inspecting the new vehicle on the Isotta-Fraschini stand would be afforded the British motoring public. Labour troubles in Italy, however, have so far delayed production that it will be impossible to display either car at Olympia, and the first chassis of each type is not expected to arrive in England until December.

All the notable features which the Paris Salon first brought to the light of day are to be found in the F.A.S.T. chassis. Its engine is a four-cylinder monobloc aluminium casting with separate steel liners; the overhead valves are operated by an overhead camshaft, lubrication to the camshaft and rocker-arms being under pressure; while unit construction of engine and gearbox has been adopted. By the R.A.C. formula, the engine (84 mm. by 135 mm.) is rated at 17.5 h.p., but acceleration up to 4,000 revs. per minute is possible, and at 3,600 revs. the brake h.p. reading is in the neighbourhood of 80. Some idea of the sporting nature of the car as a whole may be gained from the fact that a speed of eighty miles an hour is guaranteed. Two distinct systems of ignition are employed, with two magnetos and two sets of sparking plugs. The pistons are of aluminium, with five rings each. Suspension is by long, flat semi-elliptic springs, a special point being that the springs are all placed outside the chassis. Electric lighting and starting are standard fittings.

The eight-cylinder Isotta-Fraschini is equally up to date in design, and has the same feature of overhead valves in monobloc aluminium steel lined cylinders; but in this case an overhead camshaft is not embodied. Bore and stroke are respectively 85 mm. and 130 mm., and the engine is stated to give from 70 to 75 h.p. on the brake at 2,000 revs. per minute. Electric lighting and starting is fitted, of course, and further refinements are four permanently fitted automatic jacks, front wheel brakes, and an electrically operated tyre inflator.

"Puncture Proof."

THERE is often more than one method of achieving a given end, and as unpuncturability—if the word is allowed—in regard to motor-car tyres is a fruitful source of discussion, especially at the present moment, it may be interesting to consider the claims made for a preparation which is intended to seal the puncture, and prevent loss of air pressure in that fashion. The idea is not new; but on the face of it, it is a simple and possible solution of the

difficulty. The whole secret of success, of course, lies in the constitution and behaviour of the preparation which is injected into the tube, and it is on this point that previous puncture-sealing preparations have come to grief.

Puncture Proofed Tubes, Limited, believe that they have found the ideal recipe, although, naturally, they will make no statement more explicit than that it consists of 40 per cent. pure Para rubber, and one must admit that they have good grounds for the belief.

The composition, which is claimed to be an actual preservative of rubber, is injected under steam heat into the tube through the valve, and evenly distributed over the whole surface, but the final mixing process is left to be performed by centrifugal action when the tyre is on the wheel and the car running. The net result is that the inner surface of that part of the tube which corresponds with the tread is ccated to a depth of $\frac{3}{16}$ of an inch, and although there is nothing to prevent nails from entering, the air pressure immediately forces sufficient of the composition into the puncture to effectually seal it.

Four reasonably large tyres have been submitted to an R.A.C. test already. The car on which they were run was driven 363 miles in the course of several days; the tyres were all deliberately punctured with many nails and a bradawl, and at the end of the test one tyre was found to have lost 3 lbs. pressure, while the remainder gave exactly the same reading on the gauge as when the trial started.

Not at Olympia.

MONG the American cars which are not being exhibited at Olympia is the Maibohm, an illustration of which is subjoined herewith. Aircraft experience has been introduced into the 20 h.p. six-cylinder engine (3½ in. by 4½ in.), weight having been reduced as far as possible. The valves, which are set overhead, are easily adjustable, and the cylinder-head is detachable. The engine is specially designed for economy.

A two-unit electric system is driven through the gear-box, providing power for the engine-starter and



THE 20-H.P. MAIBOHM.

lighting set which are standard equipments on the Maibohm. At the rear of the chassis is the petrol tank, which has a capacity of 14 gallons, and a vacuum-feed system is employed. There are three forward speeds, and the gears are made of nickel steel. A Stewart speedometer, driven by worm pinion in the transmission case, is standard on all models. The bodies are made of seasoned ash and maple, and the upholstery is semi-bright in finish. The price complete is £575.



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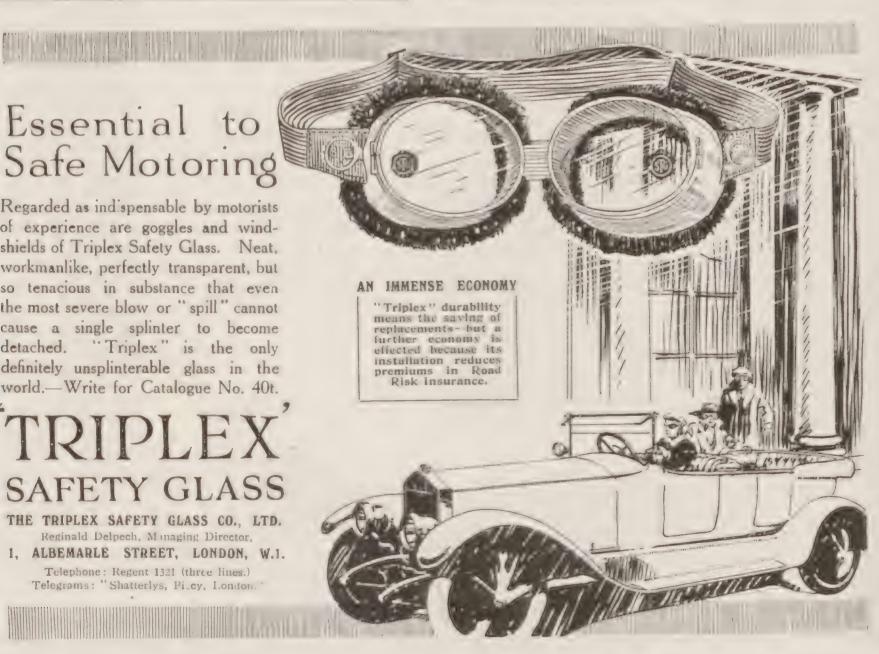
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of this Briscoe car. Its engine is sufficiently powerful to take it out of the light car category, and yet it is to cost the British motorist less than £400. Electric lighting and starting are standardised, and in many ways the vehicle has much to recommend it—a very light clutch spring being among the number.

The Liberty Six, a typical car of the better class, with carriage-work of unusual and pleasing type. The 45 h.p. engine, and the chassis generally, embody the latest features of European automobile construction, while a wide variety of bodies, including broughams, sedans and saloons, may be obtained.

11-11

A powerful Apperson, with an eight-cylinder engine. Cars of this make were produced so far back as 1893, so that although it has been a stranger to Great Britain, the car is well known in the land of its birth. The new model is of 60 h.p., and has the usual V-setting of its and has the usual V-setting of its and a body of semi-sporting lines the car has a distinct appeal for the speed merchant."

the Templar designate their production. As the engine has four cylinders of $3\frac{3}{6}$ in. bore and $5\frac{1}{2}$ in. stroke, is nominally of 18 h.p., but actually develops this description. The word "superfine," however, a remarkable amount of ingenuity and care has been expended in its design and construction.

PER TENEDED TO THE PER TENED TO THE

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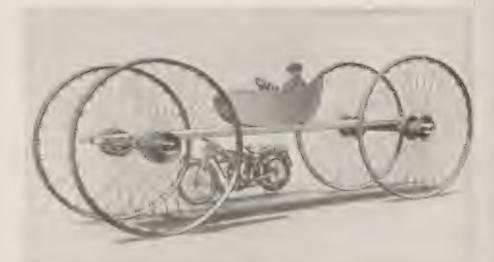
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A QUAINT CONTRAST.

THE Rudge-Whitworth detachable wire wheel all motorists know, but the accompanying illustration presents another and novel application of the principle. The four large wheels shown are each of 7 ft. diameter, and



An Aerial Transporter contrasted with a Motor-Bicycle and Side-Car.

were part and parcel of the aerial rope railways which were extensively used on the Austro-Italian front during the war. A quaint contrast in size is afforded by the juxtaposition of a motor-bicycle and side-car with the aerial carriage.

THE RAPSON TYRE TRIAL.

THE Royal Automobile Club's 10,000 miles trial of the Rapson "unpuncturable" tyre was begun on October 6th, and will be carried out at the rate of 1,000 miles per week. If all goes well, therefore, so far as concerns the hopes of the inventor, and incidentally of carowners who would welcome a tyre that gave no trouble, the trial will not finish until December 13th.

On page 53 of this issue appears a humorous presentment of the inventor engaged in an attempt to blow ten "unpuncturable bubbles." It will be noticed that Mr. Rapson is depicted as sitting on a pile of bricks representing some of his inventions; these, it may be added, are astonishingly numerous and multifarious. The patents which have been definitely granted in various countries have attained a total of no fewer than 71, but there is a further list of pending patent applications amounting to 129 in all.

The Rapson jack, in various forms, accounts for a good many of the granted and pending patents, but among other items which may be mentioned are the following:—Clutch, gun elevator, detachable wheel, aeroplane drive, anti-friction threads, engine starter, spare wheel case improvements, sparking plug, steering device, anti-friction lubricator, hood lifter, cam-operated valve, Red Cross crutch, one-piece valve, valve lubrication, window silencer, tip lorry, touring car, anti-friction block ends, anti-friction screw gear, and the "unpuncturable" tyre. Truly a formidable list!

It is interesting to note that Mr. Lionel Rapson's grand-father, John Rapson, was the inventor of steering devices which are still used throughout the Royal Navy.

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Electric outfit, including self-starter, speedometer.

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Notice

Messrs. Isotta Fraschini regret to announce that owing to strike troubles in Italy, complications due to the Railway Strike here, and also to the severe tests necessary before introduction, they consider it inadvisable to exhibit the post-war model at the present time, as it is their tarnest desire to be absolutely satisfied in every respect before placing it on the market.

The Isotta Fraschini Chassis will therefore not be on show at Olympia, but all particulars will be available at Stand No. 94.

It is hopefully expected that the Show Chassis and a trial car will be delivered to Messrs. G. Foresti, 45, Crawford Place, Edgware Road, during the month of December.

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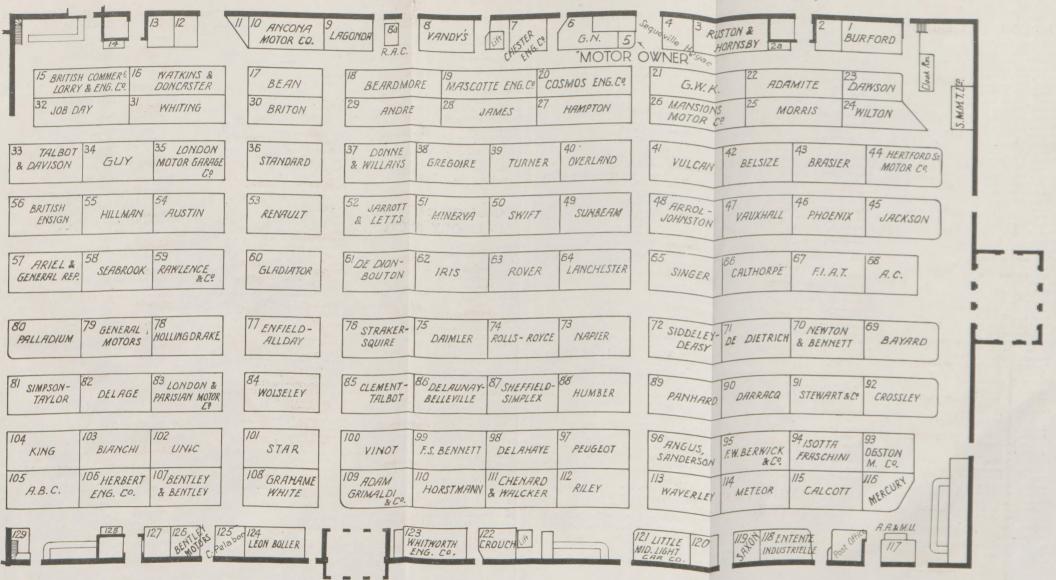
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